
**UNIVERSITY OF SOUTH CAROLINA, LANCASTER
USC LANCASTER BRADLEY HALL PHYSICS
LAB UPGRADES
STATE PROJECT #H37-9519**

APRIL 11, 2019

CONSTRUCTION DOCUMENTS


A/E PROJECT # 19010.01
 **GMK**
ASSOCIATES, INC.

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SE-310**INVITATION FOR DESIGN-BID-BUILD CONSTRUCTION SERVICES**AGENCY/OWNER: University of South CarolinaPROJECT NAME: USC Lancaster Bradley Hall Physics Lab UpgradesPROJECT NUMBER: H37-9519PROJECT LOCATION: Lancaster, South CarolinaDESCRIPTION OF PROJECT/SERVICES: Convert a physics lab to a chemistry lab by replacing lab benches, providing snorkel hoods, rework electrical, plumbing and gases to the benches. Required modifications to the mechanical, plumbing and electrical systems. Small and minority participation is strongly encouraged.BID/SUBMITTAL DUE DATE: 5/9/19 CONSTRUCTION COST RANGE: \$ 150,000 to \$ 170,000 N/A PROJECT DELIVERY METHOD: Design-Bid-Build**BID SECURITY IS REQUIRED IN AN AMOUNT NOT LESS THAN 5% OF THE BASE BID.**PERFORMANCE BOND REQUIRED? Yes No PAYMENT BOND REQUIRED? Yes No BIDDING DOCUMENTS/PLANS MAY BE OBTAINED FROM: http://purchasing.sc.edu (see Facilities Construction Solicitations & Awards)PLAN DEPOSIT AMOUNT: \$ N/A IS DEPOSIT REFUNDABLE Yes No N/A

Bidders must obtain Bidding Documents/Plans from the above listed source(s) to be listed as an official plan holder. Bidders that rely on copies obtained from any other source do so at their own risk. All written communications with official plan holders & bidders will be via email or website posting.

*All questions & correspondence concerning this Invitation shall be addressed to the A/E.*A/E NAME: GMK AssociatesA/E CONTACT: JeromeK. Simons and Doug WhiteEMAIL: jsimons@gmka.com and dwhite@gmka.comTELEPHONE: 803.256.0000AGENCY PROJECT COORDINATOR: Hatice HikmetEMAIL: HIK METH@mailbox.sc.eduTELEPHONE: 803.777.9994PRE-BID CONFERENCE: Yes No MANDATORY ATTENDANCE: Yes No PRE-BID DATE: 4/30/2019TIME: 10:00 AMPRE-BID PLACE: USC Lancaster, Bradley Hall Room 204, 476 Hubbard Drive, Lancaster, SC 29720BID DUE DATE: See Top of PageTIME: 2:00 PMBID OPENING PLACE: Conference room 100B, 1300 Pickens Street, Columbia, South Carolina 29208**BID DELIVERY ADDRESSES:****HAND-DELIVERY:**Attn: Hatice Hikmet (Bid Enclosed H37-9519)1300 Pickens StreetColumbia, South Carolina 29208**MAIL SERVICE:**Attn: Hatice Hikmet (Bid Enclosed H37-9519)1300 Pickens StreetColumbia, South Carolina 29208IS PROJECT WITHIN AGENCY CONSTRUCTION CERTIFICATION? (Agency *MUST* check one)Yes No

APPROVED BY: _____

(OSE Project Manager)

DATE: _____

**South Carolina Division of Procurement
Services, Office of the State Engineer Version of
 AIA[®] Document A701[™] – 1997**

Instructions to Bidders

This version of AIA Document A701[™]–1997 is modified by the South Carolina Division of Procurement Services, Office of the State Engineer (“SCOSE”). Publication of this version of AIA Document A701–1997 does not imply the American Institute of Architects’ endorsement of any modification by SCOSE. A comparative version of AIA Document A701–1997 showing additions and deletions by SCOSE is available for review on the SCOSE Web site.

Cite this document as “AIA Document A701[™]– 1997, Instructions to Bidders — SCOSE Version,” or “AIA Document A701[™]–1997 — SCOSE Version.”

South Carolina Division of Procurement Services, Office of the State Engineer Version of AIA® Document A701™ – 1997

Instructions to Bidders

for the following PROJECT:

(Name and location or address)

USC Lancaster Bradley Hall Physics Lab Upgrades
State Project #H37-9519
University of South Carolina, Lancaster
476 Hubbard Drive
Lancaster, South Carolina 29720

THE OWNER:

(Name, legal status and address)

University of South Carolina
1300 Pickens Street
Columbia, South Carolina 29208

The Owner is a Governmental Body of the State of South Carolina as defined by Title 11, Chapter 35 of the South Carolina Code of Laws, as amended.

THE ARCHITECT:

(Name, legal status and address)

GMK Associates
1201 Main Street, Suite 2100
Columbia, SC 29201

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This version of AIA Document A701–1997 is modified by the South Carolina Division of Procurement Services, Office of the State Engineer. Publication of this version of AIA Document A701 does not imply the American Institute of Architects' endorsement of any modification by South Carolina Division of Procurement Services, Office of the State Engineer. A comparative version of AIA Document A701–1997 showing additions and deletions by the South Carolina Division of Procurement Services, Office of the State Engineer is available for review on South Carolina state Web site.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents, collectively referred to as the **Invitation for Bids**, include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement, Instructions to Bidders, Supplementary Instructions to Bidders, the Bid Form, the Notice of Intent to Award, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract, and other documents set forth in the Bidding Documents. Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean AIA Document A101™–2007 Standard Form of Agreement Between Owner and Contractor, SCOSE edition. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean AIA Document A201™–2007 General Conditions of the Contract for Construction, SCOSE edition.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by submitting a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents and Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction. Bidders are expected to examine the Bidding Documents and Contract Documents thoroughly and should request an explanation of any ambiguities, discrepancies, errors, omissions, or conflicting statements. Failure to do so will be at the Bidder's risk. Bidder assumes responsibility for any patent ambiguity that Bidder does not bring to the Owner's attention prior to bid opening.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents and accepts full responsibility for any pre-bid existing conditions that would affect the Bid that could have been ascertained by a site visit. As provided in Regulation 19-445.2042(B), a bidder's failure to attend an advertised pre-bid conference will not excuse its responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the State.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

§ 2.1.5 CERTIFICATION OF INDEPENDENT PRICE DETERMINATION

GIVING FALSE, MISLEADING, OR INCOMPLETE INFORMATION ON THIS CERTIFICATION MAY RENDER YOU SUBJECT TO PROSECUTION UNDER SECTION 16-9-10 OF THE SOUTH CAROLINA CODE OF LAWS AND OTHER APPLICABLE LAWS.

§ 2.1.5.1 By submitting a bid, the bidder certifies that:

- .1 The prices in this bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder or competitor relating to:
 - .1 those prices;
 - .2 the intention to submit a bid; or
 - .3 the methods or factors used to calculate the prices offered.
- .2 The prices in this bid have not been and will not be knowingly disclosed by the bidder, directly or indirectly, to any other bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and
- .3 No attempt has been made or will be made by the bidder to induce any other concern to submit or not to submit a bid for the purpose of restricting competition.

§ 2.1.5.2 Each signature on the bid is considered to be a certification by the signatory that the signatory:

- .1 Is the person in the bidder's organization responsible for determining the prices being offered in this bid, and that the signatory has not participated and will not participate in any action contrary to Section 2.1.5.1 of this certification; or
- .2 Has been authorized, in writing, to act as agent for the bidder's principals in certifying that those principals have not participated, and will not participate in any action contrary to Section 2.1.5.1 of this certification [As used in this subdivision, the term "principals" means the person(s) in the bidder's organization responsible for determining the prices offered in this bid];
- .3 As an authorized agent, does certify that the principals referenced in Section 2.1.5.2.2 of this certification have not participated, and will not participate, in any action contrary to Section 2.1.5.1 of this certification; and
- .4 As an agent, has not personally participated, and will not participate, in any action contrary to Section 2.1.5.1 of this certification.

§ 2.1.5.3 If the bidder deletes or modifies Section 2.1.5.1.2 of this certification, the bidder must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

§ 2.1.6 DRUG FREE WORKPLACE

By submitting a bid, the Bidder certifies that Bidder will maintain a drug free workplace in accordance with the requirements of Title 44, Chapter 107 of South Carolina Code of Laws, as amended.

§ 2.1.7 CERTIFICATION REGARDING DEBARMENT AND OTHER RESPONSIBILITY MATTERS

§ 2.1.7.1 By submitting a Bid, Bidder certifies, to the best of its knowledge and belief, that:

- .1 Bidder and/or any of its Principals-
 - .1 Are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any state or federal agency;
 - .2 Have not, within a three-year period preceding this bid, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of bids; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and
 - .3 Are not presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in Section 2.1.7.1.1.2 of this provision.
- .2 Bidder has not, within a three-year period preceding this bid, had one or more contracts terminated for default by any public (Federal, state, or local) entity.

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- .3 "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

§ 2.1.7.2 Bidder shall provide immediate written notice to the Procurement Officer if, at any time prior to contract award, Bidder learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

§ 2.1.7.3 If Bidder is unable to certify the representations stated in Section 2.1.7.1, Bidder must submit a written explanation regarding its inability to make the certification. The certification will be considered in connection with a review of the Bidder's responsibility. Failure of the Bidder to furnish additional information as requested by the Procurement Officer may render the Bidder nonresponsible.

§ 2.1.7.4 Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by Section 2.1.7.1 of this provision. The knowledge and information of a Bidder is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

§ 2.1.7.5 The certification in Section 2.1.7.1 of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Bidder knowingly or in bad faith rendered an erroneous certification, in addition to other remedies available to the State, the Procurement Officer may terminate the contract resulting from this solicitation for default.

§ 2.1.8 ETHICS CERTIFICATE

By submitting a bid, the bidder certifies that the bidder has and will comply with, and has not, and will not, induce a person to violate Title 8, Chapter 13 of the South Carolina Code of Laws, as amended (Ethics Act). The following statutes require special attention: Section 8-13-700, regarding use of official position for financial gain; Section 8-13-705, regarding gifts to influence action of public official; Section 8-13-720, regarding offering money for advice or assistance of public official; Sections 8-13-755 and 8-13-760, regarding restrictions on employment by former public official; Section 8-13-775, prohibiting public official with economic interests from acting on contracts; Section 8-13-790, regarding recovery of kickbacks; Section 8-13-1150, regarding statements to be filed by consultants; and Section 8-13-1342, regarding restrictions on contributions by contractor to candidate who participated in awarding of contract. The state may rescind any contract and recover all amounts expended as a result of any action taken in violation of this provision. If the contractor participates, directly or indirectly, in the evaluation or award of public contracts, including without limitation, change orders or task orders regarding a public contract, the contractor shall, if required by law to file such a statement, provide the statement required by Section 8-13-1150 to the procurement officer at the same time the law requires the statement to be filed.

§ 2.1.9 RESTRICTIONS APPLICABLE TO BIDDERS & GIFTS

Violation of these restrictions may result in disqualification of your bid, suspension or debarment, and may constitute a violation of the state Ethics Act.

§ 2.1.9.1 After issuance of the solicitation, *bidder agrees not to discuss this procurement activity in any way with the Owner or its employees, agents or officials*. All communications must be solely with the Procurement Officer. This restriction may be lifted by express written permission from the Procurement Officer. This restriction expires once a contract has been formed.

§ 2.1.9.2 Unless otherwise approved in writing by the Procurement Officer, *bidder agrees not to give anything to the Owner, any affiliated organizations, or the employees, agents or officials of either, prior to award*.

§ 2.1.9.3 Bidder acknowledges that the policy of the State is that a governmental body should not accept or solicit a gift, directly or indirectly, from a donor if the governmental body has reason to believe the donor has or is seeking to obtain contractual or other business or financial relationships with the governmental body. Regulation 19-445.2165(C) broadly defines the term donor.

§ 2.1.10 IRAN DIVESTMENT ACT CERTIFICATION

§ 2.1.10.1 The Iran Divestment Act List is a list published by the State Fiscal Accountability Authority pursuant to Section 11-57-310 that identifies persons engaged in investment activities in Iran. Currently, the list is available at the

following URL: <http://procurement.sc.gov/PS/PS-iran-divestment.phtm>(.) Section 11-57-310 requires the government to provide a person ninety days written notice before he is included on the list. The following representation, which is required by Section 11-57-330(A), is a material inducement for the State to award a contract to you.

§ 2.1.10.2 By signing your Offer, you certify that, as of the date you sign, you are not on the then-current version of the Iran Divestment Act List.

§ 2.1.10.3 You must notify the Procurement Officer immediately if, at any time before posting of a final statement of award, you are added to the Iran Divestment Act List.

§ 2.1.11 OPEN TRADE REPRESENTATION (JUN 2015)

By submitting an Offer, the Offeror represents that Offeror is not currently engaged in the boycott of a person or an entity based in or doing business with a jurisdiction with whom South Carolina can enjoy open trade, as defined in SC Code Section 11-35-5300. [02-2A083-1]

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement in the number and for the deposit sum, if any, stated therein. If so provided in the Advertisement, the deposit will be refunded to all plan holders who return the Bidding Documents in good condition within ten (10) days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.3 The Owner has made copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.1.4 All persons obtaining Bidding Documents from the issuing office designated in the Advertisement shall provide that office with Bidder's contact information to include the Bidder's name, telephone number, mailing address, and email address.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least ten (10) days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by written Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them. As provided in Regulation 19-445.2042(B), nothing stated at the pre-bid conference shall change the Bidding Documents unless a change is made by written Addendum.

§ 3.3 SUBSTITUTIONS

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. Reference in the Bidding Documents to a designated material, product, thing, or service by specific brand or trade name followed by the words "or equal" and "or approved equal" shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition.

§ 3.3.2 No request to substitute materials, products, or equipment for materials, products, or equipment described in the Bidding Documents and no request for addition of a manufacturer or supplier to a list of approved manufacturers or suppliers in the Bidding Documents will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten (10) days prior to the date for receipt of Bids established in the Invitation for

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Bids. Any subsequent extension of the date for receipt of Bids by addendum shall not extend the date for receipt of such requests unless the addendum so specifies. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than 120 hours prior to the time for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

§ 3.4.5 When the date for receipt of Bids is to be postponed and there is insufficient time to issue a written Addendum prior to the original Bid Date, the Owner will notify prospective Bidders by telephone or other appropriate means with immediate follow up with a written Addendum. This Addendum will verify the postponement of the original Bid Date and establish a new Bid Date. The new Bid Date will be no earlier than the fifth (5th) calendar day after the date of issuance of the Addendum postponing the original Bid Date.

§ 3.4.6 If an emergency or unanticipated event interrupts normal government processes so that bids cannot be received at the government office designated for receipt of bids by the exact time specified in the solicitation, the time specified for receipt of bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal government processes resume. In lieu of an automatic extension, an Addendum may be issued to reschedule bid opening. If state offices are closed at the time a pre-bid or pre-proposal conference is scheduled, an Addendum will be issued to reschedule the conference.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the SE-330 Bid Form included with the Bidding Documents.

§ 4.1.2 Any blanks on the bid form to be filled in by the Bidder shall be legibly executed in a non-erasable medium. Bids shall be signed in ink or other indelible media.

§ 4.1.3 Sums shall be expressed in figures.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid. Bidder shall not make stipulations or qualify his bid in any manner not permitted on the bid form. An incomplete Bid or information not requested that is written on or attached to the Bid Form that could be considered a qualification of the Bid, may be cause for rejection of the Bid.

§ 4.1.5 All requested Alternates shall be bid. The failure of the bidder to indicate a price for an Alternate shall render the Bid non-responsive. Indicate the change to the Base Bid by entering the dollar amount and marking, as appropriate, the box for "ADD TO" or "DEDUCT FROM". If no change in the Base Bid is required, enter "ZERO" or "No Change."

For add alternates to the base bid, Subcontractor(s) listed on page BF-2 of the Bid Form to perform Alternate Work shall be used for both Alternates and Base Bid Work if Alternates are accepted.

§ 4.1.6 Pursuant to Title 11, Chapter 35, Section 3020(b)(i) of the South Carolina Code of Laws, as amended, Section 7 of the Bid Form sets forth a list of subcontractor specialties for which Bidder is required to identify only those subcontractors Bidder will use to perform the work of each listed specialty. Bidder must follow the Instructions in the Bid Form for filling out this section of the Bid Form. Failure to properly fill out Section 7 may result in rejection of Bidder's bid as non-responsive.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

§ 4.2 BID SECURITY

§ 4.2.1 If required by the Invitation for Bids, each Bid shall be accompanied by a bid security in an amount of not less than five percent of the Base Bid. The bid security shall be a bid bond or a certified cashier's check. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney. The bid bond shall:

- .1 be issued by a surety company licensed to do business in South Carolina;
- .2 be issued by a surety company having, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty", which company shows a financial strength rating of at least five (5) times the contract price.
- .3 be enclosed in the bid envelope at the time of Bid Opening, either in paper copy or as an electronic bid bond authorization number provided on the Bid Form and issued by a firm or organization authorized by the surety to receive, authenticate and issue binding electronic bid bonds on behalf the surety.

§ 4.2.3 By submitting a bid bond via an electronic bid bond authorization number on the Bid Form and signing the Bid Form, the Bidder certifies that an electronic bid bond has been executed by a Surety meeting the standards required by the Bidding Documents and the Bidder and Surety are firmly bound unto the State of South Carolina under the conditions provided in this Section 4.2.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and performance and payment bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS

§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall, unless hand delivered by the Bidder, be addressed to the Owner's designated purchasing office as shown in the Invitation for Bids. The envelope shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail or special delivery service (UPS, Federal Express, etc.), the envelope should be labeled "BID ENCLOSED" on the face thereof. Bidders hand delivering their Bids shall deliver Bids to the place of the Bid Opening as shown in the Invitation for Bids. Whether or not Bidders attend the Bid Opening, they shall give their Bids to the Owner's procurement officer or his/her designee as shown in the Invitation for Bids prior to the time of the Bid Opening.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.3.5 The official time for receipt of Bids will be determined by reference to the clock designated by the Owner's procurement officer or his/her designee. The procurement officer conducting the Bid Opening will determine and announce that the deadline has arrived and no further Bids or bid modifications will be accepted. All Bids and bid modifications in the possession of the procurement officer at the time the announcement is completed will be timely, whether or not the bid envelope has been date/time stamped or otherwise marked by the procurement officer.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be withdrawn in person or by written notice to the party receiving Bids at the place designated for receipt of Bids. Withdrawal by written notice shall be in writing over the signature of the Bidder.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 OPENING OF BIDS

§ 5.1.1 Bids received on time will be publicly opened and will be read aloud. The Owner will not read aloud Bids that the Owner determines, at the time of opening, to be non-responsive.

§ 5.1.2 At bid opening, the Owner will announce the date and location of the posting of the Notice of Intended Award.

§ 5.1.3 The Owner will send a copy of the final Bid Tabulation to all Bidders within ten (10) working days of the Bid Opening.

§ 5.1.4 If the Owner determines to award the Project, the Owner will, after posting a Notice of Intended Award, send a copy of the Notice to all Bidders.

§ 5.1.5 If only one Bid is received, the Owner will open and consider the Bid.

§ 5.2 REJECTION OF BIDS

§ 5.2.1 The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.2.2 The reasons for which the Owner will reject Bids include, but are not limited to:

- .1 Failure by a Bidder to be represented at a Mandatory Pre-Bid Conference or site visit;
- .2 Failure to deliver the Bid on time;
- .3 Failure to comply with Bid Security requirements, except as expressly allowed by law;
- .4 Listing an invalid electronic Bid Bond authorization number on the bid form;
- .5 Failure to Bid an Alternate, except as expressly allowed by law;
- .6 Failure to list qualified Subcontractors as required by law;
- .7 Showing any material modification(s) or exception(s) qualifying the Bid;
- .8 Faxing a Bid directly to the Owner or their representative; or
- .9 Failure to include a properly executed Power-of-Attorney with the bid bond.

§ 5.2.3 The Owner may reject a Bid as nonresponsive if the prices bid are materially unbalanced between line items or sub-line items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid

will result in the lowest overall cost to the Owner even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

§ 5.3 ACCEPTANCE OF BID (AWARD)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 CONTRACTOR'S RESPONSIBILITY

Owner will make a determination of Bidder's responsibility before awarding a contract. Bidder shall provide all information and documentation requested by the Owner to support the Owner's evaluation of responsibility. Failure of Bidder to provide requested information is cause for the Owner, at its option, to determine the Bidder to be non-responsible.

§ 6.2 CLARIFICATION

Pursuant to Section 11-35-1520(8), the Procurement Officer may elect to communicate with a Bidder after opening for the purpose of clarifying either the Bid or the requirements of the Invitation for Bids. Such communications may be conducted only with Bidders who have submitted a Bid which obviously conforms in all material aspects to the Invitation for Bids and only in accordance with Appendix E (Paragraph A(6)) to the Manual for Planning and Execution of State Permanent Improvement, Part II. Clarification of a Bid must be documented in writing and included with the Bid. Clarifications may not be used to revise a Bid or the Invitation for Bids. [Section 11-35-1520(8); R.19-445.2080].

§ 6.3 SUBMITTALS

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 The performance and payment bonds shall conform to the requirements of Section 11.4 of the General Conditions of the Contract. If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid.

§ 7.2 TIME OF DELIVERY CONTRACT, CERTIFICATES OF INSURANCE AND FORM OF BONDS

§ 7.2.1 After expiration of the protest period, the Owner will tender a signed Contract for Construction to the Bidder and the Bidder shall return the fully executed Contract for Construction to the Owner within seven (7) days thereafter. The Bidder shall deliver the required bonds and certificate of insurance to the Owner not later than three (3) days following the date of execution of the Contract. Failure to deliver these documents as required shall entitle the Owner to consider the Bidder's failure as a refusal to enter into a contract in accordance with the terms and conditions of the Bidder's Bid and to make claim on the Bid Security for re-procurement cost.

§ 7.2.2 The bonds shall be dated on or after the date of the Contract.

§ 7.2.3 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101-2007, Standard Form of Agreement Between Owner and Contractor, SCOSE edition.

ARTICLE 9 MISCELLANEOUS

§ 9.1 NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING IMPORTANT TAX NOTICE - NONRESIDENTS ONLY

§ 9.1.1 Withholding Requirements for Payments to Nonresidents: Section 12-8-550 of the South Carolina Code of Laws requires persons hiring or contracting with a nonresident conducting a business or performing personal services of a temporary nature within South Carolina to withhold 2% of each payment made to the nonresident. The withholding requirement does not apply to (1) payments on purchase orders for tangible personal property when the payments are not accompanied by services to be performed in South Carolina, (2) nonresidents who are not conducting business in South Carolina, (3) nonresidents for contracts that do not exceed \$10,000 in a calendar year, or (4) payments to a nonresident who (a) registers with either the S.C. Department of Revenue or the S.C. Secretary of State and (b) submits a Nonresident Taxpayer Registration Affidavit - Income Tax Withholding, Form I-312 to the person letting the contract.

§ 9.1.2 For information about other withholding requirements (e.g., employee withholding), contact the Withholding Section at the South Carolina Department of Revenue at 803-898-5383 or visit the Department's website at: www.sctax.org

§ 9.1.3 This notice is for informational purposes only. This Owner does not administer and has no authority over tax issues. All registration questions should be directed to the License and Registration Section at 803-898-5872 or to the South Carolina Department of Revenue, Registration Unit, Columbia, S.C. 29214-0140. All withholding questions should be directed to the Withholding Section at 803-898- 5383.

PLEASE SEE THE "NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING" FORM (Available through SC Department of Revenue).

§ 9.2 CONTRACTOR LICENSING

Contractors and Subcontractors listed in Section 7 of the Bid Form who are required by the South Carolina Code of Laws to be licensed, must be licensed at the time of bidding.

§ 9.3 SUBMITTING CONFIDENTIAL INFORMATION

§ 9.3.1 For every document the Bidder submits in response to or with regard to this solicitation or request, the Bidder must separately mark with the word "CONFIDENTIAL" every page, or portion thereof, that the Bidder contends contains information that is exempt from public disclosure because it is either (a) a trade secret as defined in Section 30-4-40(a)(1), or (b) privileged & confidential, as that phrase is used in Section 11-35-410.

§ 9.3.2 For every document the Bidder submits in response to or with regard to this solicitation or request, the Bidder must separately mark with the words "TRADE SECRET" every page, or portion thereof, that the Bidder contends contains a trade secret as that term is defined by Section 39-8-20 of the Trade Secrets Act.

§ 9.3.3 For every document the Bidder submits in response to or with regard to this solicitation or request, the Bidder must separately mark with the word "PROTECTED" every page, or portion thereof, that the Bidder contends is protected by Section 11-35-1810.

§ 9.3.4 All markings must be conspicuous; use color, bold, underlining, or some other method in order to conspicuously distinguish the mark from the other text. Do not mark your entire bid as confidential, trade secret, or protected! If your bid, or any part thereof, is improperly marked as confidential or trade secret or protected, the State may, in its sole discretion, determine it nonresponsive. If only portions of a page are subject to some protection, do not mark the entire page.

§ 9.3.5 By submitting a response to this solicitation, Bidder (1) agrees to the public disclosure of every page of every document regarding this solicitation or request that was submitted at any time prior to entering into a contract

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(including, but not limited to, documents contained in a response, documents submitted to clarify a response, & documents submitted during negotiations), unless the page is conspicuously marked "TRADE SECRET" or "CONFIDENTIAL" or "PROTECTED", (2) agrees that any information not marked, as required by these bidding instructions, as a "Trade Secret" is not a trade secret as defined by the Trade Secrets Act, & (3) agrees that, notwithstanding any claims or markings otherwise, any prices, commissions, discounts, or other financial figures used to determine the award, as well as the final contract amount, are subject to public disclosure.

§ 9.3.6 In determining whether to release documents, the State will detrimentally rely on the Bidders' marking of documents, as required by these bidding instructions, as being either "Confidential" or "Trade Secret" or "PROTECTED".

§ 9.3.7 By submitting a response, the Bidder agrees to defend, indemnify & hold harmless the State of South Carolina, its officers & employees, from every claim, demand, loss, expense, cost, damage or injury, including attorney's fees, arising out of or resulting from the State withholding information that Bidder marked as "confidential" or "trade secret" or "PROTECTED".

§ 9.4 POSTING OF INTENT TO AWARD

The SE-370, Notice of Intent to Award, will be posted at the following location:

Room or Area of Posting: Lobby

Building Where Posted: USC Facilities Office

Address of Building: 1300 Pickens Street, Columbia, SC 29208

WEB site address (if applicable): <http://purchasing.sc.edu>

Posting date will be announced at bid opening. In addition to posting the notice, the Owner will promptly send all responsive bidders a copy of the notice of intent to award and the final bid tabulation

§ 9.5 PROTEST OF SOLICITATION OR AWARD

§ 9.5.1 Any prospective bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the solicitation of a contract shall protest within fifteen (15) days of the date of issuance of the applicable solicitation document at issue. Any actual bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the intended award or award of a contract shall protest within ten (10) days of the date notification of intent to award is posted in accordance with Title 11, Chapter 35, Section 4210 of the South Carolina Code of Laws, as amended. A protest shall be in writing, shall set forth the grounds of the protest and the relief requested with enough particularity to give notice of the issues to be decided, and must be received by the State Engineer within the time provided.

§ 9.5.2 Any protest must be addressed to the CPO, Office of State Engineer, and submitted in writing:

- .1 by email to protest-ose@mso.sc.gov,
- .2 by facsimile at 803-737-0639, or
- .3 by post or delivery to 1201 Main Street, Suite 600, Columbia, SC 29201.

By submitting a protest to the foregoing email address, you (and any person acting on your behalf) consent to receive communications regarding your protest (and any related protests) at the e-mail address from which you sent your protest.

§ 9.6 SOLICITATION INFORMATION FROM SOURCES OTHER THAN OFFICIAL SOURCE

South Carolina Business Opportunities (SCBO) is the official state government publication for State of South Carolina solicitations. Any information on State agency solicitations obtained from any other source is unofficial and any reliance placed on such information is at the bidder's sole risk and is without recourse under the South Carolina Consolidated Procurement Code.

§ 9.7 BUILDER'S RISK INSURANCE

Bidders are directed to Article 11.3 of the South Carolina Modified AIA Document A201, 2007 Edition, which, unless provided otherwise in the bid documents, requires the contractor to provide builder's risk insurance on the project.

§ 9.8 TAX CREDIT FOR SUBCONTRACTING WITH MINORITY FIRMS

§ 9.8.1 Pursuant to Section 12-6-3350, taxpayers, who utilize certified minority subcontractors, may take a tax credit equal to 4% of the payments they make to said subcontractors. The payments claimed must be based on work performed directly for a South Carolina state contract. The credit is limited to a maximum of fifty thousand dollars annually. The

taxpayer is eligible to claim the credit for 10 consecutive taxable years beginning with the taxable year in which the first payment is made to the subcontractor that qualifies for the credit. After the above ten consecutive taxable years, the taxpayer is no longer eligible for the credit. The credit may be claimed on Form TC-2, "Minority Business Credit." A copy of the subcontractor's certificate from the Governor's Office of Small and Minority Business (OSMBA) is to be attached to the contractor's income tax return.

§ 9.8.2 Taxpayers must maintain evidence of work performed for a State contract by the minority subcontractor. Questions regarding the tax credit and how to file are to be referred to: SC Department of Revenue, Research and Review, Phone: (803) 898-5786, Fax: (803) 898-5888.

§ 9.8.3 The subcontractor must be certified as to the criteria of a "Minority Firm" by the Governor's Office of Small and Minority Business Assistance (OSMBA). Certificates are issued to subcontractors upon successful completion of the certification process. Questions regarding subcontractor certification are to be referred to: Governor's Office of Small and Minority Business Assistance, Phone: (803) 734-0657, Fax: (803) 734-2498. Reference: SC §11-35-5010 – Definition for Minority Subcontractor & SC §11-35-5230 (B) – Regulations for Negotiating with State Minority Firms.

§ 9.9 OTHER SPECIAL CONDITIONS OF THE WORK

None

Note: AIA Document A310

Contractor to Provide

Bid Bond

In the form of

AIA A310

SE-330 LUMP SUM BID FORM

Bidders shall submit bids on only Bid Form SE-330.

BID SUBMITTED BY: _____
(Bidder's Name)

BID SUBMITTED TO: University of South Carolina
(Owner's Name)

FOR: PROJECT NAME: USC Lancaster Bradley Hall Physics Lab Upgrades
PROJECT NUMBER: H37-9519

OFFER

§ 1. In response to the Invitation for Construction Services and in compliance with the Instructions to Bidders for the above-named Project, the undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with the Owner on the terms included in the Bidding Documents, and to perform all Work as specified or indicated in the Bidding Documents, for the prices and within the time frames indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

§ 2. Pursuant to SC Code § 11-35-3030(1), Bidder has submitted Bid Security as follows in the amount and form required by the Bidding Documents:

Bid Bond with Power of Attorney Electronic Bid Bond Cashier's Check
(Bidder check one)

§ 3. Bidder acknowledges the receipt of the following Addenda to the Bidding Documents and has incorporated the effects of said Addenda into this Bid:

(Bidder, check all that apply. Note, there may be more boxes than actual addenda. Do not check boxes that do not apply)

ADDENDA: #1 #2 #3 #4 #5

§ 4. Bidder accepts all terms and conditions of the Invitation for Bids, including, without limitation, those dealing with the disposition of Bid Security. Bidder agrees that this Bid, including all Bid Alternates, if any, may not be revoked or withdrawn after the opening of bids, and shall remain open for acceptance for a period of **60** Days following the Bid Date, or for such longer period of time that Bidder may agree to in writing upon request of the Owner.

§ 5. Bidder herewith offers to provide all labor, materials, equipment, tools of trades and labor, accessories, appliances, warranties and guarantees, and to pay all royalties, fees, permits, licenses and applicable taxes necessary to complete the following items of construction work:

§ 6.1 **BASE BID WORK** (as indicated in the Bidding Documents and generally described as follows): Convert a physics lab to a chemistry lab by replacing lab benches, providing snorkel hoods, rework electrical, plumbing and gases to the benches. Required modifications to the mechanical, plumbing and electrical systems

\$ _____, which sum is hereafter called the Base Bid.

(Bidder to insert Base Bid Amount on line above)

SE-330
LUMP SUM BID FORM

§ 6.2 **BID ALTERNATES** as indicated in the Bidding Documents and generally described as follows:

ALTERNATE # 1 (Brief Description): Prep and recoat entire lab floor with epoxy coating instead of patching the floor at slab repairs.

ADD TO or **DEDUCT FROM BASE BID:** \$ _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

ALTERNATE # 2 (Brief Description): _____

ADD TO or **DEDUCT FROM BASE BID:** \$ _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

ALTERNATE # 3 (Brief Description): _____

ADD TO or **DEDUCT FROM BASE BID:** \$ _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

§ 6.3 **UNIT PRICES:**

BIDDER offers for the Agency’s consideration and use, the following **UNIT PRICES**. The **UNIT PRICES** offered by **BIDDER** indicate the amount to be added to or deducted from the **CONTRACT SUM** for each item-unit combination. **UNIT PRICES** include all costs to the Agency, including those for materials, labor, equipment, tools of trades and labor, fees, taxes, insurance, bonding, overhead, profit, etc. The Agency reserves the right to include or not to include any of the following **UNIT PRICES** in the Contract and to negotiate the **UNIT PRICES** with **BIDDER**.

No.	ITEM	UNIT OF MEASURE	ADD	DEDUCT
<u>1.</u>	_____	_____	\$ _____	\$ _____
<u>2.</u>	_____	_____	\$ _____	\$ _____
<u>3.</u>	_____	_____	\$ _____	\$ _____
<u>4.</u>	_____	_____	\$ _____	\$ _____
<u>5.</u>	_____	_____	\$ _____	\$ _____
<u>6.</u>	_____	_____	\$ _____	\$ _____

SE-330
LUMP SUM BID FORM

§ 7. LISTING OF PROPOSED SUBCONTRACTORS PURSUANT TO SECTION 3020(b)(i), CHAPTER 35, TITLE 11 OF THE SOUTH CAROLINA CODE OF LAWS, AS AMENDED
(See Instructions on the following page BF-2A)

Bidder shall use the below-listed Subcontractors in the performance of the Subcontractor Specialty Classification work listed:

(A) SUBCONTRACTOR SPECIALTY <i>(Completed by Owner)</i>	(B) CLASSIFICATION or SUBCLASSIFICATION ABBREVIATION <i>(Completed by Owner)</i>	(C) SUBCONTRACTOR'S or PRIME CONTRACTOR'S NAME <i>(Required - must be completed by Bidder)</i>	(D) SUBCONTRACTOR'S or PRIME CONTRACTOR'S SC LICENSE NUMBER <i>(Requested, but not Required)</i>
BASE BID			
Electrical	EL		
Plumbing	PB		
Packaged Equipment	PK		
ALTERNATE #1			
ALTERNATE #2			
ALTERNATE #3			

If a Bid Alternate is accepted, Subcontractors listed for the Bid Alternate shall be used for the work of both the Alternate and the Base Bid work.

SE-330 LUMP SUM BID FORM

§ 8. LIST OF MANUFACTURERS, MATERIAL SUPPLIERS, AND SUBCONTRACTORS OTHER THAN SUBCONTRACTORS LISTED IN SECTION 7 ABOVE (*FOR INFORMATION ONLY*):

Pursuant to instructions in the Invitation for Construction Services, if any, Bidder will provide to Owner upon the Owner's request and within 24 hours of such request, a listing of manufacturers, material suppliers, and subcontractors, other than those listed in Section 7 above, that Bidder intends to use on the project. Bidder acknowledges and agrees that this list is provided for purposes of determining responsibility and not pursuant to the subcontractor listing requirements of SC Code § 11-35-3020(b)(i).

§ 9. TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES

a) CONTRACT TIME

Bidder agrees that the Date of Commencement of the Work shall be established in a Notice to Proceed to be issued by the Owner. Bidder agrees to substantially complete the Work within 60 Calendar Days from the Date of Commencement, subject to adjustments as provided in the Contract Documents.

b) LIQUIDATED DAMAGES

Bidder further agrees that from the compensation to be paid, the Owner shall retain as Liquidated Damages the amount of \$ 250 for each Calendar Day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion as provided in the Contract Documents. This amount is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty for nonperformance.

§ 10. AGREEMENTS

- a) Bidder agrees that this bid is subject to the requirements of the laws of the State of South Carolina.
- b) Bidder agrees that at any time prior to the issuance of the Notice to Proceed for this Project, this Project may be canceled for the convenience of, and without cost to, the State.
- c) Bidder agrees that neither the State of South Carolina nor any of its agencies, employees or agents shall be responsible for any bid preparation costs, or any costs or charges of any type, should all bids be rejected or the Project canceled for any reason prior to the issuance of the Notice to Proceed.

§ 11. ELECTRONIC BID BOND

By signing below, the Principal is affirming that the identified electronic bid bond has been executed and that the Principal and Surety are firmly bound unto the State of South Carolina under the terms and conditions of the AIA Document A310, Bid Bond, included in the Bidding Documents.

ELECTRONIC BID BOND NUMBER: _____

SIGNATURE AND TITLE: _____

**SE-330
LUMP SUM BID FORM**

CONTRACTOR'S CLASSIFICATIONS AND SUBCLASSIFICATIONS WITH LIMITATION

SC Contractor's License Number(s): _____

Classification(s) & Limits: _____

Subclassification(s) & Limits: _____

By signing this Bid, the person signing reaffirms all representation and certification made by both the person signing and the Bidder, including without limitation, those appearing in Article 2 of the SCOSE Version of the AIA A701, Instructions to Bidders, is expressly incorporated by reference.

BIDDER'S LEGAL NAME: _____

ADDRESS: _____

TELEPHONE: _____

EMAIL: _____

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____

TITLE: _____

SCOSE Version of AIA A101, Agreement Between Owner & Contractor Payment is Stipulated Sum

The Form of the Contract shall be the SCOSE Version of the AIA Document A101-2007, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, which is incorporated herein by reference. Samples of these documents may be viewed at <http://procurement.sc.gov/construction/ose-news>.

**South Carolina Division of Procurement
Services, Office of the State Engineer Version of
 AIA[®] Document A201[™] – 2007**

General Conditions of the Contract for Construction

This version of AIA Document A201[™]–2007 is modified by the South Carolina Division of Procurement Services, Office of the State Engineer (“SCOSE”). Publication of this version of AIA Document A201–2007 does not imply the American Institute of Architects’ endorsement of any modification by SCOSE. A comparative version of AIA Document A201–2007 showing additions and deletions by SCOSE is available for review on the SCOSE Web site.

Cite this document as “AIA Document A201[™]–2007, General Conditions of the Contract for Construction—SCOSE Version,” or “AIA Document A201[™]–2007 — SCOSE Version.”

South Carolina Division of Procurement Services, Office of the State Engineer Version of AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

USC Lancaster Bradley Hall Physics Lab Upgrades
State Project #H37-9519
476 Hubbard Drive, Lancaster, South Carolina 29720

THE OWNER:

(Name, legal status and address)

University of South Carolina
1300 Pickens Street
Columbia, South Carolina 29208

The Owner is a Governmental Body of the State of South Carolina as defined by Title 11, Chapter 35 of the South Carolina Code of Laws, as amended.

THE ARCHITECT:

(Name, legal status and address)

GMK Associates
1201 Main Street, Suite 2100
Columbia, SC 29201

This version of AIA Document A201–2007 is modified by the South Carolina Division of Procurement, Office of the State Engineer. Publication of this version of AIA Document A201 does not imply the American Institute of Architects' endorsement of any modification by South Carolina Division of Procurement, Office of the State Engineer. A comparative version of AIA Document A201–2007 showing additions and deletions by the South Carolina Division of Procurement, Office of the State Engineer is available for review on the State of South Carolina Web site.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean AIA Document A101™–2007 Standard Form of Agreement Between Owner and Contractor, SCOSE edition. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean AIA Document A201™–2007 General Conditions of the Contract for Construction, SCOSE edition.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 NOTICE TO PROCEED

The Notice to Proceed is a document issued by the Owner to the Contractor, with a copy to the Architect, directing the Contractor to begin prosecution of the Work in accordance with the requirements of the Contract Documents. The Notice to Proceed shall fix the date on which the Contract Time will commence.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. In the event of patent ambiguities within or between parts of the Contract Documents, the Contractor shall 1) provide the better quality or greater quantity of Work, or 2) comply with the more stringent requirement, either or both in accordance with the Architect's interpretation.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as a violation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization, except as provided in Section 7.1.2. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's Representative. [Reference § 8.3 of the Agreement.]

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen (15) days after receipt of a written request, information necessary and relevant for the Contractor to post Notice of Project Commencement pursuant to Title 29, Chapter 5, Section 23 of the South Carolina Code of Laws, as amended.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. Subject to the Contractor's obligations, including those in Section 3.2, the Contractor shall be entitled to rely on the accuracy of information furnished by the Owner pursuant to this Section but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services; however, the Owner does not warrant the accuracy of any such information requested by the Contractor that is not otherwise required of the Owner by the Contract Documents. Neither the Owner nor the Architect shall be required to conduct investigations or to furnish the Contractor with any information concerning subsurface characteristics or other conditions of the area where the Work is to be performed beyond that which is provide in the Contract Documents.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one electronic copy (.pdf format) of the Contract Documents. The Contractor may make reproductions of the Contract Documents pursuant to Section 1.5.2.

§ 2.2.6 The Owner assumes no responsibility for any conclusions or interpretation made by the Contractor based on information made available by the Owner.

§ 2.2.7 The Owner shall obtain, at its own cost, general building and specialty inspection services as required by the Contract Documents. The Contractor shall be responsible for payment of any charges imposed for reinspections.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect, including but not limited to providing necessary resources, with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Directive shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term “Contractor” means the Contractor or the Contractor’s authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect’s administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. The Contractor acknowledges that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Owner, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Owner.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor’s review is made in the Contractor’s capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor’s notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from latent errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed by the Owner in writing to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements shall be considered defective. Unless caused by the Contractor or a subcontractor at any tier, the Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. The Contractor shall comply with the requirements of Title 12, Chapter 8 of the South Carolina Code of Laws, as amended, regarding withholding tax for nonresidents, employees, contractors and subcontractors.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or

negotiations concluded. Pursuant to Title 10, Chapter 1, Section 180 of the South Carolina Code of Laws, as amended, no local general or specialty building permits are required for state buildings.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 7.3.3.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect the difference between actual costs, as documented by invoices, and the allowances under Section 3.8.2.1.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent, acceptable to the Owner, and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner the name and qualifications of a proposed superintendent. The Owner may reply within 14 days to the Contractor in

writing stating whether the Owner has reasonable objection to the proposed superintendent. Failure of the Owner to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall notify the Owner, in writing, of any proposed change in the superintendent, including the reason therefore, prior to making such change. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 Additional requirements, if any, for the constructions schedule are as follows:
(Check box if applicable to this Contract))

The construction schedule shall be in a detailed precedence-style critical path management (CPM) or primavera-type format satisfactory to the Owner and the Architect that shall also (1) provide a graphic representation of all activities and events that will occur during performance of the work; (2) identify each phase of construction and occupancy; and (3) set forth dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents (hereinafter referred to as "Milestone Dates"). Upon review and acceptance by the Owner and the Architect of the Milestone Dates, the construction schedule shall be deemed part of the Contract Documents and attached to the Agreement as Exhibit "A." If not accepted, the construction schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and resubmitted for acceptance. The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. Whenever the approved construction schedule no longer reflects actual conditions and progress of the work or the Contract Time is modified in accordance with the terms of the Contract Documents, the Contractor shall update the accepted construction schedule to reflect such conditions. In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, any Milestone Date, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to Change Order.

§ 3.10.4 The Owner's review and acceptance of the Contractor's schedule is not conducted for the purpose of either determining its accuracy and completeness or approving the construction means, methods, techniques, sequences or procedures. The Owner's approval shall not relieve the Contractor of any obligations. Unless expressly addressed in a Modification, the Owner's approval of a schedule shall not change the Contract Time.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.5.1 The fire sprinkler shop drawings shall be prepared by a licensed fire sprinkler contractor and shall accurately reflect actual conditions affecting the required layout of the fire sprinkler system. The fire sprinkler contractor shall certify the accuracy of his shop drawings prior to submitting them for review and approval. The fire sprinkler shop drawings shall be reviewed and approved by the Architect's engineer of record who, upon approving the sprinkler shop drawings will submit them to the State Fire Marshal for review and approval. A copy of the shop drawings will also be sent to OSE for information. The Architect's engineer of record will submit a copy of the State Fire Marshal's approval letter to the Contractor, Architect, and OSE. Unless authorized in writing by OSE, neither the Contractor nor subcontractor at any tier shall submit the fire sprinkler shop drawings directly to the State Fire Marshal for approval.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, who shall comply with reasonable requirements of the Owner regarding qualifications and insurance and whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 Protection of construction materials and equipment stored at the Project site from weather, theft, vandalism, damage, and all other adversity is solely the responsibility of the Contractor. The Contractor shall perform the work in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building materials, and equipment likely to cause hazardous conditions.

§ 3.13.3 The Contractor and any entity for which the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Architect is that person or entity identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents. Any reference in the Contract Documents to the Architect taking action or rendering a decision with a "reasonable time" is understood to mean no more than fourteen days, unless otherwise specified in the Contract Documents or otherwise agreed to by the parties.

§ 4.2.2 The Architect will visit the site as necessary to fulfill its obligation to the Owner for inspection services, if any, and, at a minimum, to assure conformance with the Architect's design as shown in the Contract Documents and to observe the progress and quality of the various components of the Contractor's Work, and to determine if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or

continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Work completed and correlated with the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will, in the first instance, interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. Upon receipt of such request, the Architect will promptly provide the non-requesting party with a copy of the request. The Architect's response to such requests will be made in writing with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, and will not show partiality to either. Except in the case of interpretations resulting in omissions, defects, or errors in the Instruments of Service or perpetuating omissions, defects, or errors in the Instruments of Service, the Architect will not be liable for results of interpretations or decisions rendered in good faith. If either party disputes the Architect's interpretation or decision, that party may proceed as provided in Article 15. The Architect's interpretations and decisions may be, but need not be, accorded any deference in any review conducted pursuant to law or the Contract Documents.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents so as to avoid delay to the construction of the Project. The Architect's response to such requests will be made in writing with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. Any response to a request for information must be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. Unless issued pursuant to a Modification, supplemental Drawings or Specifications will not involve an adjustment to the Contract Sum or Contract Time.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, within fourteen days after posting of the Notice of Intent to Award the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (excluding Listed Subcontractors but including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Owner may reply within 14 days to the Contractor in writing stating whether the Owner has reasonable objection to any such proposed person or entity. Failure of the Owner to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner has made reasonable and timely objection. The Owner shall not direct the Contractor to contract with any specific individual or entity for supplies or services unless such supplies and services are necessary for completion of the Work and the specified individual or entity is the only source of such supply or services.

§ 5.2.3 If the Owner has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner has no reasonable objection. If the proposed but rejected Subcontractor was

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reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner makes reasonable objection to such substitution. The Contractor's request for substitution must be made to the Owner in writing accompanied by supporting information.

§ 5.2.5 A Subcontractor identified in the Contractor's Bid in response the specialty subcontractor listing requirements of Section 7 of the Bid Form (SE-330) may only be substituted in accordance with and as permitted by the provisions of Title 11, Chapter 35, Section 3021 of the South Carolina Code of Laws, as amended. A proposed substitute for a Listed Subcontractor shall be subject to the Owner's approval as set forth in Section 5.2.3.

§ 5.2.6 The Iran Divestment Act List is a list published by the State Fiscal Accountability Authority pursuant to Section 11-57-310 that identifies persons engaged in investment activities in Iran. Currently, the list is available at the following URL: <http://procurement.sc.gov/PS/PS-iran-divestment.phtml>(.) Consistent with Section 11-57-330(B), the Contractor shall not contract with any person to perform a part of the Work, if, at the time you enter into the subcontract, that person is on the then-current version of the Iran Divestment Act List.

§ 5.3 SUBCONTRACTUAL RELATIONS

§ 5.3.1 By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise herein or in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.2 Without limitation on the generality of Section 5.3.1, each Subcontract agreement and each Sub-subcontract agreement shall include, and shall be deemed to include, the following Sections of these General Conditions: 3.2, 3.5, 3.18, 5.3, 5.4, 6.2.2, 7.3.3, 7.5, 7.6, 13.1, 13.12, 14.3, 14.4, and 15.1.6.

§ 5.3.3 Each Subcontract Agreement and each Sub-subcontract agreement shall exclude, and shall be deemed to exclude, Sections 13.2 and 13.6 and all of Article 15, except Section 15.1.6, of these General Conditions. In the place of these excluded sections of the General Conditions, each Subcontract Agreement and each Sub-subcontract may include Sections 13.2.1 and 13.6 and all of Article 15, except Section 15.1.6, of AIA Document A201-2007, Conditions of the Contract, as originally issued by the American Institute of Architects.

§ 5.3.4 The Contractor shall assure the Owner that all agreements between the Contractor and its Subcontractor incorporate the provisions of Subparagraph 5.3.1 as necessary to preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the work to be performed by Subcontractors so that the subcontracting thereof will not prejudice such rights. The Contractor's assurance shall be in the form of an affidavit or in such other form as the Owner may approve. Upon request, the Contractor shall provide the Owner or Architect with copies of any or all subcontracts or purchase orders.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

§ 5.4.4 Each subcontract shall specifically provide that the Owner shall only be responsible to the subcontractor for those obligations of the Contractor that accrue subsequent to the Owner's exercise of any rights under this conditional assignment.

§ 5.4.5 Each subcontract shall specifically provide that the Subcontractor agrees to perform portions of the Work assigned to the Owner in accordance with the Contract Documents.

§ 5.4.6 Nothing in this Section 5.4 shall act to reduce or discharge the Contractor's payment bond surety's obligations to claimants for claims arising prior to the Owner's exercise of any rights under this conditional assignment.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Reserved.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable

for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone. If the amount of a Modification exceeds the limits of the Owner's Construction Change Order Certification (reference Section 9.1.7.2 of the Agreement), then the Owner's agreement is not effective, and Work may not proceed, until approved in writing by the Office of State Engineer.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect (using Form SE-380 "Construction Change Order") and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 If a Change Order provides for an adjustment to the Contract Sum, the adjustment must be calculated in accordance with Section 7.3.3.

§ 7.2.3 At the Owner's request, the Contractor shall prepare a proposal to perform the work of a proposed Change Order setting forth the amount of the proposed adjustment, if any, in the Contract Sum; and the extent of the proposed adjustment, if any, in the Contract Time. Any proposed adjustment in the Contract sum shall be prepared in accordance with Section 7.2.2. The Owner's request shall include any revisions to the Drawings or Specifications necessary to define any changes in the Work. Within fifteen days of receiving the request, the Contractor shall submit the proposal to the Owner and Architect along with all documentation required by Section 7.6.

§ 7.2.4 If the Contractor requests a Change Order, the request shall set forth the proposed change in the Work and shall be prepared in accordance with Section 7.2.3. If the Contractor requests a change to the Work that involves a revision to either the Drawings or Specifications, the Contractor shall reimburse the Owner for any expenditure associated with the Architects' review of the proposed revisions, except to the extent the revisions are accepted by

execution of a Change Order.

§ 7.2.5 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, any adjustments to the Contract Sum or the Contract Time.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 PRICE ADJUSTMENTS

§ 7.3.3.1 If any Modification, including a Construction Change Directive, provides for an adjustment to the Contract Sum, the adjustment shall be based on whichever of the following methods is the most valid approximation of the actual cost to the contractor, with overhead and profit as allowed by Section 7.5:

- .1 Mutual acceptance of a lump sum;
- .2 Unit prices stated in the Contract Documents, except as provided in Section 7.3.4, or subsequently agreed upon;
- .3 Cost attributable to the events or situations under applicable clauses with adjustment of profits or fee, all as specified in the contract, or subsequently agreed upon by the parties, or by some other method as the parties may agree; or
- .4 As provided in Section 7.3.7.

§ 7.3.3.2 Consistent with Section 7.6, costs must be properly itemized and supported by substantiating data sufficient to permit evaluation before commencement of the pertinent performance or as soon after that as practicable. All costs incurred by the Contractor must be justifiably compared with prevailing industry standards. Except as provided in Section 7.5, all adjustments to the Contract Price shall be limited to job specific costs and shall not include indirect costs, overhead, home office overhead, or profit.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall make an initial determination, consistent with Section 7.3.3, of the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.5. In such case, and also under Section 7.3.3.1.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work.

§ 7.3.8 Using the percentages stated in Section 7.5, any adjustment to the Contract Sum for deleted work shall include any overhead and profit attributable to the cost for the deleted Work.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

§ 7.5 AGREED OVERHEAD AND PROFIT RATES

§ 7.5.1 For any adjustment to the Contract Sum for which overhead and profit may be recovered, other than those made pursuant to Unit Prices stated in the Contract Documents, the Contractor agrees to charge and accept, as full payment for overhead and profit, the following percentages of costs attributable to the change in the Work. The percentages cited below shall be considered to include all indirect costs including, but not limited to: field and office managers, supervisors and assistants, incidental job burdens, small tools, and general overhead allocations. The allowable percentages for overhead and profit are as follows:

- .1 To the Contractor for work performed by the Contractor's own forces, 17% of the Contractor's actual costs.
- .2 To each Subcontractor for work performed by the Subcontractor's own forces, 17% of the subcontractor's actual costs.
- .3 To the Contractor for work performed by a subcontractor, 10% of the subcontractor's actual costs (not including the subcontractor's overhead and profit).

§ 7.6 PRICING DATA AND AUDIT

§ 7.6.1 Cost or Pricing Data

Upon request of the Owner or Architect, Contractor shall submit cost or pricing data prior to execution of a Modification which exceeds \$500,000. Contractor shall certify that, to the best of its knowledge and belief, the cost or pricing data submitted is accurate, complete, and current as of a mutually determined specified date prior to the date of pricing the Modification. Contractor's price, including profit, shall be adjusted to exclude any significant sums by which such price was increased because Contractor furnished cost or pricing data that was inaccurate, incomplete, or not current as of the date specified by the parties. Notwithstanding Subparagraph 9.10.4, such adjustments may be made after final payment to the Contractor.

§ 7.6.2 Cost or pricing data means all facts that, as of the date specified by the parties, prudent buyers and sellers would reasonably expect to affect price negotiations significantly. Cost or pricing data are factual, not judgmental; and are verifiable. While they do not indicate the accuracy of the prospective contractor's judgment about estimated future costs or projections, they do include the data forming the basis for that judgment. Cost or pricing data are

more than historical accounting data; they are all the facts that can be reasonably expected to contribute to the soundness of estimates of future costs and to the validity of determinations of costs already incurred.

§ 7.6.3 Records Retention

As used in Section 7.6, the term "records" means any books or records that relate to cost or pricing data that Contractor is required to submit pursuant to Section 7.6.1. Contractor shall maintain records for three years from the date of final payment, or longer if requested by the chief procurement officer. The Owner may audit Contractor's records at reasonable times and places.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly commence operations on the site or elsewhere prior to the effective date of surety bonds and insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such surety bonds or insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the control of the Contractor and any subcontractor at any tier; or by delay authorized by the Owner pending dispute resolution; or by other causes that the Architect determines may justify delay, then to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time and provided the delay (1) is not caused by the fault or negligence of the Contractor or a subcontractor at any tier and (2) is not due to unusual delay in the delivery of supplies, machinery, equipment, or services when such supplies, machinery, equipment, or services were obtainable from other sources in sufficient time for the Contractor to meet the required delivery, the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents. All changes to the Contract Sum shall be adjusted in accordance with Section 7.3.3.

§ 9.2 SCHEDULE OF VALUES

§ 9.2.1 The Contractor shall submit to the Architect, within ten days of full execution of the Agreement, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. As requested by the Architect, the Contractor and each Subcontractor shall prepare a trade payment breakdown for the Work for which each is responsible, such breakdown being submitted on a uniform standardized format approved by the Architect and Owner. The breakdown shall be divided in detail, using convenient units, sufficient to accurately determine the value of completed Work during the course of the Project. The Contractor shall update the schedule of values as required by either the Architect or Owner as necessary to reflect:

- .1 the description of Work (listing labor and material separately);
- .2 the total value;
- .3 the percent and value of the Work completed to date;
- .4 the percent and value of previous amounts billed; and
- .5 the current percent completed and amount billed.

§ 9.2.2 Any schedule of values or trade breakdown that fails to include sufficient detail, is unbalanced, or exhibits "front-loading" of the value of the Work shall be rejected. If a schedule of values or trade breakdown is used as the basis for payment and later determined to be inaccurate, sufficient funds shall be withheld from future Applications for Payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Work.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 Monthly, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require (such as copies of requisitions from Subcontractors and material suppliers) and shall reflect retainage and any other adjustments provided in Section 5 of the Agreement. If required by the Owner or Architect, the Application for Payment shall be accompanied by a current construction schedule.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing provided such materials or equipment will be subsequently incorporated in the Work. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site. The Contractor shall 1) protect such materials from diversion, vandalism, theft, destruction, and damage, 2) mark such materials specifically for use on the Project, and 3) segregate such materials from other materials at the storage facility. The Architect and the Owner shall have the right to make inspections of the storage areas at any time.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

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§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated in both the Application for Payment and, if required to be submitted by the Contractor, the accompanying current construction schedule and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, or (3) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect shall withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. The Architect shall withhold a Certificate of Payment if the Application for Payment is not accompanied by the current construction schedule required by Section 3.10.1. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 Pursuant to Chapter 6 of Title 29 of the South Carolina Code of Laws, as amended, the Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment to the Owner, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the time established in the Contract Documents the amount certified by the Architect or awarded by final dispute resolution order, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased, in accordance with the provisions of Section 7.3.3, by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use and when all required occupancy permits, if any, have been issued and copies have been delivered to the Owner.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive written list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect, with the Owner and any other person the Architect or the Owner choose, will make an inspection on a date and at a time mutually agreeable to the Architect, Owner, and Contractor, to determine whether the Work or designated portion thereof is substantially complete. The Contractor shall furnish access for the inspection and testing as provided in this Contract. The inspection shall include a demonstration by the Contractor that all equipment, systems and operable components of the Work function properly and in accordance with the Contract Documents. If the Architect's inspection discloses any item, whether

or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion. If more than one Substantial Completion inspection is required, the Contractor shall reimburse the Owner for all costs of re-inspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor.

§ 9.8.3.1 If the Architect and Owner concur in the Contractor's assessment that the Work or a portion of the Work is safe to occupy, the Owner and Contractor may arrange for a Certificate of Occupancy Inspection by OSE. The Owner, Architect, and Contractor shall be present at OSE's inspection. Upon verifying that the Work or a portion of the Work is substantially complete and safe to occupy, OSE will issue, as appropriate, a Full or Partial Certificate of Occupancy.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Unless the parties agree otherwise in the Certificate of Substantial Completion, the Contractor shall achieve Final Completion no later than thirty days after Substantial Completion. Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect, with the Owner and any other person the Architect or the Owner choose, will make an inspection on a date and at a time mutually agreeable to the Architect, Owner, and Contractor, and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will

constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. If more than one Final Completion inspection is required, the Contractor shall reimburse the Owner for all costs of re-inspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor. If the Contractor does not achieve final completion within thirty days after Substantial Completion or the timeframe agreed to by the parties in the Certificate of Substantial Completion, whichever is greater, the Contractor shall be responsible for any additional Architectural fees resulting from the delay.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner, (6) required Training Manuals, (7) equipment Operations and Maintenance Manuals, (8) any certificates of testing, inspection or approval required by the Contract Documents and not previously provided (9) all warranties and guarantees required under or pursuant to the Contract Documents, and (10) one copy of the Documents required by Section 3.11.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is delayed 60 days through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those specific claims in stated amounts that have been previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.10.6 If OSE has not previously issued a Certificate of Occupancy for the entire Project, the Parties shall arrange for a representative of OSE to participate in the Final Completion Inspection. Representatives of the State Fire Marshal's Office and other authorities having jurisdiction may be present at the Final Completion Inspection or otherwise inspect the completed Work and advise the Owner whether the Work meets their respective requirements for the Project.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;

- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 If the Contractor encounters a hazardous material or substance which was not discoverable as provided in Section 3.2.1 and not required by the Contract Documents, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons or serious loss to real or personal property resulting from such material or substance encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing. Hazardous materials or substances are those hazardous, toxic, or radioactive materials or substances subject to regulations by applicable governmental authorities having jurisdiction, such as, but not limited to, the S.C. Department of Health and Environmental Control, the U.S. Environmental Protection Agency, and the U.S. Nuclear Regulatory Commission.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or

who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up. In the absence of agreement, the Architect will make an interim determination regarding any delay or impact on the Contractor's additional costs. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15. Any adjustment in the Contract Sum shall be determined in accordance with Section 7.3.3.

§ 10.3.3 The Work in the affected area shall be resumed immediately following the occurrence of any one of the following events: (a) the Owner causes remedial work to be performed that results in the absence of hazardous materials or substances; (b) the Owner and the Contractor, by written agreement, decide to resume performance of the Work; or (c) the Work may safely and lawfully proceed, as determined by an appropriate governmental authority or as evidenced by a written report to both the Owner and the Contractor, which is prepared by an environmental engineer reasonably satisfactory to both the Owner and the Contractor.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 In addition to its obligations under Section 3.18, the Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 Reserved.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7. The Contractor shall immediately give the Architect notice of the emergency. This initial notice may be oral followed within five days by a written notice setting forth the nature and scope of the emergency. Within fourteen days of the start of the emergency, the Contractor shall give the Architect a written estimate of the cost and probable effect of delay on the progress of the Work.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;

- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified below or required by law, whichever coverage is greater. Coverages, shall be written on an occurrence basis and shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

- .1 **COMMERCIAL GENERAL LIABILITY:**
 - (a) General Aggregate (per project) \$1,000,000
 - (b) Products/Completed Operations \$1,000,000
 - (c) Personal and Advertising Injury \$1,000,000
 - (d) Each Occurrence \$1,000,000
 - (e) Damage to Rented Premises (ea occurrence) \$50,000
 - (f) Medical Expense (Any one person) \$5,000
- .2 **BUSINESS AUTO LIABILITY (including All Owned, Non-owned, and Hired Vehicles):**
 - (a) Combined Single Limit \$1,000,000
- .3 **WORKER'S COMPENSATION:**
 - (a) State Statutory
 - (b) Employers Liability \$100,000 per Acc.
..... \$500,000 Disease, Policy Limit
..... \$100,000 Disease, Each Employee

In lieu of separate insurance policies for Commercial General Liability, Business Auto Liability, and Employers Liability, the Contractor may provide an umbrella policy meeting or exceeding all coverage requirements set forth in this Section 11.1.2. The umbrella policy limits shall not be less than \$3,000,000.

§ 11.1.3 Prior to commencement of the Work, and thereafter upon replacement of each required policy of insurance, the Contractor shall provide to the Owner a written endorsement to the Contractor's general liability insurance policy that:

- .1 names the Owner as an additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations;
- .2 provides that no material alteration, cancellation, non-renewal, or expiration of the coverage contained in such policy shall have effect unless all additional insureds have been given at least ten (10) days prior written notice of cancellation for non-payment of premiums and thirty (30) days prior written notice of cancellation for any other reason; and
- .3 provides that the Contractor's liability insurance policy shall be primary, with any liability insurance of the Owner as secondary and noncontributory.

Prior to commencement of the Work, and thereafter upon renewal or replacement of each required policy of insurance, the Contractor shall provide to the Owner a signed, original certificate of liability insurance (ACORD 25). Consistent with this Section 11.1, the certificate shall identify the types of insurance, state the limits of liability for each type of coverage, name the Owner a Consultants as Certificate Holder, provide that the general aggregate limit applies per project, and provide that coverage is written on an occurrence basis. Both the certificates and the endorsements must be received directly from either the Contractor's insurance agent or the insurance company. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, naming the Owner as an additional insured for claims made under the Contractor's completed operations, and otherwise meeting the above requirements, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required

by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 A failure by the Owner to either (i) demand a certificate of insurance or written endorsement required by Section 11.1, or (ii) reject a certificate or endorsement on the grounds that it fails to comply with Section 11.1, shall not be considered a waiver of Contractor's obligations to obtain the required insurance.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided in the Contract Documents, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 Reserved.

§ 11.3.1.3 Reserved.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Contractor shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. To the extent any losses are covered and paid for by such insurance, the Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Owner requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Contractor shall, if possible, include such insurance, and the cost thereof shall be charged to the Owner by appropriate Change Order.

§ 11.3.5 Reserved.

§ 11.3.6 Before an exposure to loss may occur, the Contractor shall file with the Owner a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Owner.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent the property insurance provided by the Contractor pursuant to this Section 11.3 covers and pays for the damage, except such rights as they have to proceeds of such insurance held by the Contractor as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Contractor's property insurance shall be adjusted by the Contractor as fiduciary and made payable to the Contractor as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Contractor as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Contractor's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Contractor shall deposit in a separate account proceeds so received, which the Contractor shall distribute in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor.

§ 11.3.10 The Contractor as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Contractor's exercise of this power; if such objection is made, the dispute shall be resolved in the manner provided in the contract between the parties in dispute as the method of binding dispute resolution. The Contractor as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with a final order or determination issued by the appropriate authority having jurisdiction over the dispute.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 Before commencing any services hereunder, the Contractor shall provide the Owner with Performance and Payment Bonds, each in an amount not less than the Contract Price set forth in Article 4 of the Agreement. The Surety shall have, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty". In addition, the Surety shall have a minimum "Best Financial Strength Category" of "Class V", and in no case less than five (5) times the contract amount. The Performance Bond shall be written on Form SE-355, "Performance Bond" and the Payment Bond shall be written on Form SE-357, "Labor and Material Payment Bond", and both shall be made payable to the Owner.

§ 11.4.2 The Performance and Labor and Material Payment Bonds shall:

- .1 be issued by a surety company licensed to do business in South Carolina;
- .2 be accompanied by a current power of attorney and certified by the attorney-in-fact who executes the bond on the behalf of the surety company; and

- .3 remain in effect for a period not less than one (1) year following the date of Substantial Completion or the time required to resolve any items of incomplete Work and the payment of any disputed amounts, whichever time period is longer.

§ 11.4.3 Any bonds required by this Contract shall meet the requirements of the South Carolina Code of Laws and Regulations, as amended.

§ 11.4.4 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the requirements specifically expressed in the Contract Documents, including inspections of work-in-progress required by all authorities having jurisdiction over the Project, it must, upon demand of the Architect or authority having jurisdiction, be uncovered for observation and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2 unless otherwise provided in the Contract Documents.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents. If, prior to the date of Substantial Completion, the Contractor, a Subcontractor, or anyone for whom either is responsible, uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract, any dispute, claim, or controversy relating to the Contract, and all the rights and obligations of the parties shall, in all respects, be interpreted, construed, enforced and governed by and under the laws of the State of South Carolina, except its choice of law rules.

§ 13.2 SUCCESSORS AND ASSIGNS

The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole, or in part, without written consent of the other and then only in accordance with and as permitted by Regulation 19-445.2180 of the South Carolina Code of Regulations, as amended. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.3 WRITTEN NOTICE

Unless otherwise permitted herein, all notices contemplated by the Contract Documents shall be in writing and shall be deemed given:

- .1 upon actual delivery, if delivery is by hand;
- .2 upon receipt by the transmitting party of confirmation or reply, if delivery is by electronic mail, facsimile, telex or telegram;
- .3 upon receipt, if delivery is by the United States mail.

Notice to Contractor shall be to the address provided in Section 8.4.2 of the Agreement. Notice to Owner shall be to the address provided in Section 8.3.2 of the Agreement. Either party may designate a different address for notice by giving notice in accordance with this paragraph.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Unless expressly provided otherwise, duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.4.3 Notwithstanding Section 9.10.4, the rights and obligations which, by their nature, would continue beyond the termination, cancellation, rejection, or expiration of this contract shall survive such termination, cancellation, rejection, or expiration, including, but not limited to, the rights and obligations created by the following clauses:

- 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service;
- 3.5 Warranty
- 3.17 Royalties, Patents and Copyrights
- 3.18 Indemnification
- 7.6 Cost or Pricing Data
- 11.1 Contractor's Liability Insurance
- 11.4 Performance and Payment Bond
- 15.1.6 Claims for Listed Damages
- 15.1.7 Waiver of Claims Against the Architect
- 15.6 Dispute Resolution
- 15.6.5 Service of Process

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due to the Contractor and unpaid under the Contract Documents shall bear interest only if and to the extent allowed by Title 29, Chapter 6, Article 1 of the South Carolina Code of Laws. Amounts due to the Owner shall bear interest at the rate of one percent a month or a pro rata fraction thereof on the unpaid balance as may be due.

§ 13.7 Reserved

§ 13.8 PROCUREMENT OF MATERIALS BY OWNER

The Contractor accepts assignment of all purchase orders and other agreements for procurement of materials and equipment by the Owner that are identified as part of the Contract Documents. The Contractor shall, upon delivery, be responsible for the storage, protection, proper installation, and preservation of such Owner purchased items, if any, as if the Contractor were the original purchaser. The Contract Sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation, and testing of items covered in any assigned purchase orders or agreements. Unless the Contract Documents specifically provide otherwise, all Contractor warranty of workmanship and correction of the Work obligations under the Contract Documents shall apply to the Contractor's installation of and modifications to any Owner purchased items.

§ 13.9 INTERPRETATION OF BUILDING CODES

As required by Title 10, Chapter 1, Section 180 of the South Carolina Code of Laws, as amended, OSE shall determine the enforcement and interpretation of all building codes and referenced standards on state buildings. The Contractor shall refer any questions, comments, or directives from local officials to the Owner and OSE for resolution.

§ 13.10 MINORITY BUSINESS ENTERPRISES

Contractor shall notify Owner of each Minority Business Enterprise (MBE) providing labor, materials, equipment, or supplies to the Project under a contract with the Contractor. Contractor's notification shall be via the first monthly status report submitted to the Owner after execution of the contract with the MBE. For each such MBE, the Contractor shall provide the MBE's name, address, and telephone number, the nature of the work to be performed or materials or equipment to be supplied by the MBE, whether the MBE is certified by the South Carolina Office of Small and Minority Business Assistance, and the value of the contract.

§ 13.11 SEVERABILITY

If any provision or any part of a provision of the Contract Documents shall be finally determined to be superseded, invalid, illegal, or otherwise unenforceable pursuant to any applicable Legal Requirements, such determination shall not impair or otherwise affect the validity, legality, or enforceability of the remaining provision or parts of the provision of the Contract Documents, which shall remain in full force and effect as if the unenforceable provision or part were deleted.

§ 13.12 ILLEGAL IMMIGRATION

Contractor certifies and agrees that it will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina Code of Laws and agrees to provide to the State upon request any documentation required to establish either: (a) that Title 8, Chapter 14 is inapplicable both to Contractor and its subcontractors or sub-subcontractors; or (b) that Contractor and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14. Pursuant to Section 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both." Contractor agrees to include in any contracts with its subcontractors language requiring its subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-subcontractors language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14. (An overview is available at www.procurement.sc.gov)

§ 13.13 SETOFF

The Owner shall have all of its common law, equitable, and statutory rights of set-off.

§ 13.14 DRUG-FREE WORKPLACE

The Contractor certifies to the Owner that Contractor will provide a Drug-Free Workplace, as required by Title 44, Chapter 107 of the South Carolina Code of Laws, as amended.

§ 13.15 FALSE CLAIMS

According to the S.C. Code of Laws § 16-13-240, "a person who by false pretense or representation obtains the signature of a person to a written instrument or obtains from another person any chattel, money, valuable security, or other property, real or personal, with intent to cheat and defraud a person of that property is guilty" of a crime.

§ 13.16 NON-INDEMNIFICATION

Any term or condition is void to the extent it requires the State to indemnify anyone. It is unlawful for a person charged with disbursements of state funds appropriated by the General Assembly to exceed the amounts and purposes stated in the appropriations. (§ 11-9-20) It is unlawful for an authorized public officer to enter into a contract for a purpose in which the sum is in excess of the amount appropriated for that purpose. It is unlawful for an authorized public officer to divert or appropriate the funds arising from any tax levied and collected for any one fiscal year to the payment of an indebtedness contracted or incurred for a previous year. (§ 11-1-40)

§ 13.17 OPEN TRADE (JUN 2015)

During the contract term, including any renewals or extensions, Contractor will not engage in the boycott of a person or an entity based in or doing business with a jurisdiction with whom South Carolina can enjoy open trade, as defined in SC Code Section 11-35-5300. [07-7A053-1]

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 45 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires substantially all Work to be stopped; or
- .2 An act of government, such as a declaration of national emergency that requires substantially all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents and the Contractor has stopped work in accordance with Section 9.7

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages. Any adjustment to the Contract Sum pursuant to this Section shall be made in accordance with the requirements of Article 7.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials, or otherwise fails to prosecute the Work, or any separable part of the Work, with the diligence, resources and skill that will ensure its completion within the time specified in the Contract Documents, including any authorized adjustments;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the Contract Documents and the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.2.5 If, after termination for cause, it is determined that the Owner lacked justification to terminate under Section 14.2.1, or that the Contractor's default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Owner under Section 14.4.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Any adjustment to the Contract Sum made pursuant to this section shall be made in accordance with the requirements of Article 7.3.3. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract in whole or in part for the Owner's convenience and without cause. The Owner shall give written notice of the termination to the Contractor specifying the part of the Contract terminated and when termination becomes effective.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work;
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders; and
- .4 **complete the performance of the Work not terminated, if any.**

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, and any other adjustments otherwise allowed by the Contract. Any adjustment to the Contract Sum made pursuant to this Section 14.4 shall be made in accordance with the requirements of Article 7.3.3.

§ 14.4.4 Contractor's failure to include an appropriate termination for convenience clause in any subcontract shall not (i) affect the Owner's right to require the termination of a subcontract, or (ii) increase the obligation of the Owner beyond what it would have been if the subcontract had contained an appropriate clause.

§ 14.4.5 Upon written consent of the Contractor, the Owner may reinstate the terminated portion of this Contract in whole or in part by amending the notice of termination if it has been determined that:

- .1 the termination was due to withdrawal of funding by the General Assembly, Governor, or State Fiscal Accountability Authority or the need to divert project funds to respond to an emergency as defined by Regulation 19-445.2110(B) of the South Carolina Code of Regulations, as amended;
- .2 funding for the reinstated portion of the work has been restored;
- .3 circumstances clearly indicate a requirement for the terminated work; and
- .4 reinstatement of the terminated work is advantageous to the Owner.

§ 14.5 CANCELLATION AFTER AWARD BUT PRIOR TO PERFORMANCE

Pursuant to Title 11, Chapter 35 and Regulation 19-445.2085 of the South Carolina Code of Laws and Regulations, as amended, this contract may be canceled after award but prior to performance.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. A voucher, invoice, payment application or other routine request for payment that is not in dispute when submitted is not a Claim under this definition. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Architect. Such notice shall include sufficient information to advise the Architect and other party of the circumstances giving rise to the claim, the specific contractual adjustment or relief requested and the basis of such request. Claims by either party arising prior to the date final payment is due must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later except as stated for adverse weather days in Section 15.1.5.2. By failing to give written notice of a Claim within the time required by this Section, a party expressly waives its claim.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, including any administrative review allowed under Section 15.6, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will issue Certificates for Payment in accordance with the initial decisions and determinations of the Architect.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary. Claims for an increase in the Contract Time shall be based on one additional calendar day for each full calendar day that the Contractor is prevented from working.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

- .1 Claims for adverse weather shall be based on actual weather conditions at the job site or other place of performance of the Work, as documented in the Contractor's job site log.
- .2 For the purpose of this Contract, a total of five (5) days per calendar month (non-cumulative) shall be anticipated as "adverse weather" at the job site, and such time will not be considered justification for an extension of time. If, in any month, adverse weather develops beyond the five (5) days, the Contractor shall be allowed to claim additional days to compensate for the excess weather delays only to the extent of the impact on the approved construction schedule and days the contractor was already scheduled to work. The remedy for this condition is for an extension of time only and is exclusive of all other rights and remedies available under the Contract Documents or imposed or available by law.
- .3 The Contractor shall submit monthly with their pay application all claims for adverse weather conditions that occurred during the previous month. The Architect shall review each monthly submittal in accordance with Section 15.5 and inform the Contractor and the Owner promptly of its evaluation. Approved days shall be included in the next Change Order issued by the Architect. Adverse weather conditions not claimed within the time limits of this Subparagraph shall be considered to be waived by the Contractor. Claims will not be allowed for adverse weather days that occur after the scheduled (original or adjusted) date of Substantial Completion.

§ 15.1.6 CLAIMS FOR LISTED DAMAGES

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor and Owner waive Claims against each other for listed damages arising out of or relating to this Contract.

§ 15.1.6.1 For the Owner, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) costs suffered by a third party unable to commence work, (vi) attorney's fees, (vii) any interest, except to the extent allowed by Section 13.6 (Interest), (viii) lost revenue and profit for lost use of the property, (ix) costs resulting from lost productivity or efficiency.

§ 15.1.6.2 For the Contractor, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest, except to the extent allowed by Section 13.6 (Interest); (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waived against the Owner. Without limitation, this mutual waiver is applicable to all damages due to either party's termination in accordance with Article 14.

§ 15.1.6.3 Nothing contained in this Section shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

§ 15.1.7 WAIVER OF CLAIMS AGAINST THE ARCHITECT

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor waives all claims against the Architect and any other design professionals who provide design and/or project management services to the Owner, either directly or as independent contractors or subcontractors to the Architect, for listed damages arising out of or relating to this Contract. The listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest; (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waived against the Owner. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

§ 15.2 Reserved.

§ 15.3 Reserved.

§ 15.4 Reserved.

§ 15.5 CLAIM AND DISPUTES - DUTY OF COOPERATION, NOTICE, AND ARCHITECTS INITIAL DECISION

§ 15.5.1 Contractor and Owner are fully committed to working with each other throughout the Project to avoid or minimize claims. To further this goal, Contractor and Owner agree to communicate regularly with each other and the Architect at all times notifying one another as soon as reasonably possible of any issue that if not addressed may cause loss, delay, and/or disruption of the Work. If claims do arise, Contractor and Owner each commit to resolving such claims in an amicable, professional, and expeditious manner to avoid unnecessary losses, delays, and disruptions to the Work.

§ 15.5.2 Claims shall first be referred to the Architect for initial decision. An initial decision shall be required as a condition precedent to resolution pursuant to Section 15.6 of any Claim arising prior to the date of final payment, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered, or after all the Architect's requests for additional supporting data have been answered, whichever is later. The Architect will not address claims between the Contractor and persons or entities other than the Owner.

§ 15.5.3 The Architect will review Claims and within ten days of the receipt of a Claim (1) request additional supporting data from the claimant or a response with supporting data from the other party or (2) render an initial decision in accordance with Section 15.5.5.

§ 15.5.4 If the Architect requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Architect when the response or supporting data will be furnished or (3) advise the Architect that all supporting data has already been provided. Upon receipt of the response or supporting data, the Architect will render an initial decision in accordance with Section 15.5.5.

§ 15.5.5 The Architect will render an initial decision in writing; (1) stating the reasons therefor; and (2) notifying the parties of any change in the Contract Sum or Contract Time or both. The Architect will deliver the initial decision to the parties within two weeks of receipt of any response or supporting data requested pursuant to Section 16.4 or within such longer period as may be mutually agreeable to the parties. If the parties accept the initial decision, the Architect shall prepare a Change Order with appropriate supporting documentation for the review and approval of the parties and the Office of State Engineer. If either the Contractor, Owner, or both, disagree with the initial decision, the Contractor and Owner shall proceed with dispute resolution in accordance with the provisions of Section 15.6.

§ 15.5.6 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.6 DISPUTE RESOLUTION

§ 15.6.1 If a claim is not resolved pursuant to Section 15.5 to the satisfaction of either party, both parties shall attempt to resolve the dispute at the field level through discussions between Contractor's Representative and Owner's Representative. If a dispute cannot be resolved through Contractor's Representative and Owner's Representative, then the Contractor's Senior Representative and the Owner's Senior Representative, upon the request of either party, shall meet as soon as conveniently possible, but in no case later than twenty-one days after such a request is made, to attempt to resolve such dispute. Prior to any meetings between the Senior Representatives, the parties will exchange relevant information that will assist the parties in resolving their dispute. The meetings required by this Section are a condition precedent to resolution pursuant to Section 15.6.2.

§ 15.6.2 If after meeting in accordance with the provisions of Section 15.6.1, the Senior Representatives determine that the dispute cannot be resolved on terms satisfactory to both the Contractor and the Owner, then either party may submit the dispute by written request to South Carolina's Chief Procurement Officer for Construction (CPOC). Except as otherwise provided in Article 15, all claims, claims, or controversies relating to the Contract shall be resolved exclusively by the appropriate Chief Procurement Officer in accordance with Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws, or in the absence of jurisdiction, only in the Court of Common Pleas for, or in the absence of jurisdiction a federal court located in, Richland County, State of South Carolina. Contractor agrees

that any act by the State regarding the Contract is not a waiver of either the State's sovereign immunity or the State's immunity under the Eleventh Amendment of the United State's Constitution.

§ 15.6.3 If any party seeks resolution to a dispute pursuant to Section 15.6.2, the parties shall participate in non-binding mediation to resolve the claim. If the claim is governed by Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws as amended and the amount in controversy is \$100,000.00 or less, the CPOC shall appoint a mediator, otherwise, the mediation shall be conducted by an impartial mediator selected by mutual agreement of the parties, or if the parties cannot so agree, a mediator designated by the American Arbitration Association ("AAA") pursuant to its Construction Industry Mediation Rules. The mediation will be governed by and conducted pursuant to a mediation agreement negotiated by the parties or, if the parties cannot so agree, by procedures established by the mediator.

§ 15.6.4 Without relieving any party from the other requirements of Sections 15.5 and 15.6, either party may initiate proceedings in the appropriate forum prior to initiating or completing the procedures required by Sections 15.5 and 15.6 if such action is necessary to preserve a claim by avoiding the application of any applicable statutory period of limitation or repose.

§ 15.6.5 SERVICE OF PROCESS

Contractor consents that any papers, notices, or process necessary or proper for the initiation or continuation of any claims, claims, or controversies relating to the Contract; for any court action in connection therewith; or for the entry of judgment on any award made, may be served on Contractor by certified mail (return receipt requested) addressed to Contractor at the address provided for the Contractor's Senior Representative or by personal service or by any other manner that is permitted by law, in or outside South Carolina. Notice by certified mail is deemed duly given upon deposit in the United States mail.

ARTICLE 16 PROJECT-SPECIFIC REQUIREMENTS AND INFORMATION

§ 16.1 INSPECTION REQUIREMENTS *(Indicate the inspection services required by the Contract)*

- Special Inspections are required and are not part of the Contract Sum. *(see section 01400)*
- Building Inspections are required and are not part of the Contract Sum. *(see section 01400)*

The inspections required for this Work are:

(Indicate which services are required and the provider)

- Civil:
- Structural:
- Mechanical:
- Plumbing:
- Electrical:
- Gas:
- Other *(list)*:

Remarks: All Inspections Provided by Owner

§ 16.1.1 Contractor shall schedule and request inspections in an orderly and efficient manner and shall notify the Owner whenever the Contractor schedules an inspection in accordance with the requirements of Section 16.1. Contractor shall be responsible for the cost of inspections scheduled and conducted without the Owner's knowledge and for any increase in the cost of inspections resulting from the inefficient scheduling of inspections.

§ 16.2 List Cash Allowances, if any. *(Refer to attachments as needed, or enter NONE)*
None.

§ 16.3 Requirements for Record Drawings, if any. *(Refer to attachments as needed, or enter NONE)*

Refer to technical specification sections.

§ 16.4 Requirements for Shop Drawings and other submittals, if any, including number, procedure for submission, list of materials to be submitted, etc. *(Refer to attachments as needed, or enter NONE)*

Refer to technical specification sections.

§ 16.5 Requirements for signage, on-site office or trailer, utilities, restrooms, etc., in addition to the Contract, if any. *(Refer to attachments as needed, or enter NONE)*

Refer to technical specification sections.

§ 16.6 Requirements for Project Cleanup in addition to the Contract, if any. *(Refer to attachments as needed, or enter NONE)*

Refer to technical specification sections.

§ 16.7 List all attachments that modify these General Conditions. *(If none, enter NONE)*

USC Supplemental General Conditions
Contractor's One Year Warranty

USC SUPPLEMENTAL GENERAL CONDITIONS FOR CONSTRUCTION PROJECTS

WORK AREAS

1. The Contractor shall maintain the job site in a safe manner at all times. This includes (but is not limited to) the provision and/or maintenance of lighting, fencing, barricades around obstructions, and safety and directional signage.
2. Contractor's employees shall take all reasonable means not to interrupt the flow of student traffic in building corridors, lobbies, stairs and exterior walks. All necessary and reasonable safety precautions shall be taken to prevent injury to building occupants while transporting materials and equipment through the work area. Providing safe, accessible, plywood-shielded pedestrian ways around construction may be required if a suitable alternative route is not available.
3. At the beginning of the project, the USC Project Manager will establish the Contractor's lay-down area. This area will also be used for the Contractor's work vehicles. The lay-down area will be clearly identified to the contractor by the Project Manager, with a sketch or drawing provided to USC Parking Services. In turn, Parking Services will mark off this area with a sign containing the project name, Project Manager's name, Contractor name and contact number, and end date. Where this area is subject to foot traffic, protective barriers will be provided as specified by the Project Manager. The area will be maintained in a neat and orderly fashion.
4. Work vehicles parked in the lay down area (or designated parking areas) will be clearly marked and display a USC-furnished placard for identification. No personal vehicles will be allowed in this area, or in any areas surrounding the construction site. Personal vehicles must be parked in the perimeter parking lots or garages. Temporary parking permits can be obtained at the Contractor's expense at the USC Parking Office located in the Pendleton Street parking garage. Refer to the CAMPUS VEHICLE EXPECTATIONS (below) for additional information.
5. Contractor is responsible for removal of all debris from the site, and is required to provide the necessary dumpsters which will be emptied on a regular basis. Construction waste must not be placed in University dumpsters. The construction site must be thoroughly cleaned with all trash picked up and properly disposed of on a daily basis and the site must be left in a safe and sanitary condition each day. The University will inspect job sites regularly and will fine any contractor found to be in violation of this requirement an amount of up to \$1,000 per violation.
6. The Contractor shall be responsible for erosion and sediment control measures where ground disturbances are made.

PROJECT FENCING

7. All construction projects with exterior impacts shall have construction fencing at the perimeter. Fencing shall be 6' chain link with black or green privacy fabric (80-90% blockage). For fence panels with footed stands, sandbag weights shall be placed on the inside of the fence. Ripped sandbags shall be replaced immediately.
8. For projects with long fencing runs and/or high profile locations, decorative USC banners shall be used on top of privacy fabric; banners should be used at a ratio of one banner for every five fence panels. USC Project Manager will make arrangements for banner delivery for Contractor to hang.
9. The use of plastic safety fencing is discouraged and shall only be used on a temporary basis (less than four weeks) where absolutely necessary. Safety fencing shall be a neon yellow-green, high-

visibility fencing equal to 'Kryptonight' by Tenax. Safety fencing shall be erected and maintained in a neat and orderly fashion throughout the project.

10. Vehicles and all other equipment shall be contained within a fenced area if they are on site for more than 3 consecutive calendar days.

BEHAVIOR

11. Fraternalization between Contractor's employees and USC students, faculty or staff is strictly prohibited.
12. USC will not tolerate rude, abusive or degrading behavior on the job site. Heckling and cat-calling directed toward students, faculty or staff or any other person on USC property is strictly prohibited. Any contractor whose employees violate this requirement will be assessed a fine of up to \$500 per violation.
13. Contractor's employees must adhere to the University's policy of maintaining a drug-free and tobacco-free campus.

HAZARDOUS MATERIALS & SAFETY COMPLIANCE

14. A USC Permit to Work must be signed prior to any work being performed by the general contractor or sub-contractor(s).
15. The contractor will comply with all regulations set forth by OSHA and SCDHEC. Contractor must also adhere to USC's internal policies and procedures (available by request). Upon request, the contractor will submit all Safety Programs and Certificates of Insurance to the University for review.
16. Contractor must notify the University immediately upon the discovery of suspect material which may contain asbestos or other such hazardous materials. These materials must not be disturbed until approved by the USC Project Manager.
17. In the event of an OSHA inspection, the Contractor shall immediately call the Facilities Call Center, 803-777-4217, and report that an OSHA inspector is on site. An employee from USC's Safety Unit will arrive to assist in the inspection.

LANDSCAPE & TREE PROTECTION

18. In conjunction with the construction documents, the USC Arborist shall direct methods to minimize damage to campus trees. Tree protection fencing is required to protect existing trees and other landscape features to be affected by a construction project. The location of this fence will be evaluated for each situation with the USC Arborist, Landscape Architect and Project Manager. Tree protection fencing may be required along access routes as well as within the project area itself. Fence locations may have to be reset throughout the course of the project.
19. The tree protection fence shall be 6' high chain link fence with 80-90% privacy screening unless otherwise approved by USC Arborist and/or Landscape Architect. If the tree protection fence is completely within a screened jobsite fence perimeter, privacy fabric is not required. In-ground fence posts are preferred in most situations for greater protection. If utility or pavement conflicts are present, fence panels in footed stands are acceptable. See attached detail for typical tree protection fencing.
20. No entry, vehicle parking, or materials storage will be allowed inside the tree protection zone. A 4"

layer of mulch shall be placed over the tree protection area to maintain moisture in the root zone.

21. Where it is necessary to cross walks, tree root zones (i.e., under canopy) or lawns the following protective measures shall be taken:
 - a. For single loads up to 9,000 lbs., a 3/4" minimum plywood base shall be placed over 4" of mulch.
 - b. For single loads over 9,000 lbs., two layers of 3/4" plywood shall be placed over 4" of mulch.
 - c. Plywood sheets shall be replaced as they deteriorate or delaminate with exposure.
 - d. For projects requiring heavier loads, a construction entry road consisting of 10' X 16' oak logging mats on 12" coarse, chipped, hardwood base. Mulch and logging mats shall be supplemented throughout the project to keep matting structurally functional.
22. Damage to any trees during construction shall be assessed by the USC Arborist, who will stipulate what action will be taken for remediation of damage. The cost of any and all remediation will be assumed by the contractor at no additional cost to the project. Compensation for damages may be assessed up to \$500 per caliper inch of tree (up to 8") and \$500 per inch of diameter at breast height (for trees over 8").
23. Damage to trunks and limbs, as well as disturbance of the root zone under the dripline of tree, including compaction of soil, cutting or filling, or storage of materials, shall qualify as damage and subject to remediation.
24. Any damage to existing pavements or landscaping (including lawn areas and irrigation) will be remediated before final payment is made.

TEMPORARY FACILITIES

25. Contractor will be responsible for providing its own temporary toilet facilities, unless prior arrangements are made with the USC Project Manager.
26. Use of USC communications facilities (telephones, computers, etc.) by the Contractor is prohibited, unless prior arrangements are made with the USC Project Manager.

CAMPUS KEYS

27. Contractor must sign a Contractor Key Receipt/Return form before any keys are issued. Keys must be returned immediately upon the completion of the work. The Contractor will bear the cost of any re-keying necessary due to the loss of or failure to return keys.

WELDING

28. A welding (hot work) permit must be issued by the University Fire Marshall before any welding can begin inside a building. The USC Project Manager will coordinate.

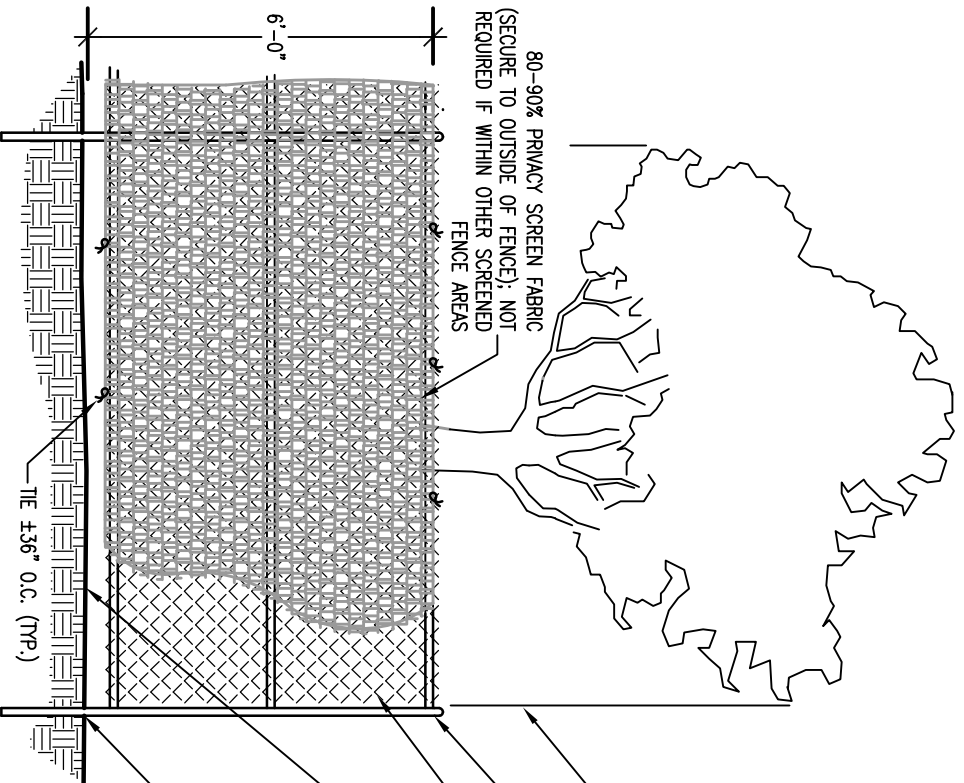
PROJECT EVALUATION & CLOSE-OUT

29. For all projects over \$100,000, including IDCs, a Contractor Performance Evaluation (SE 397) will be reviewed with the GC at the beginning of the project and a copy given to the GC. At the end of the project the form will be completed by the USC Project Manager and a Construction Performance rating will be established.
30. Contractor must provide all O&M manuals, as-built drawings, and training of USC personnel on new equipment, controls, etc. prior to Substantial Completion. Final payment will not be made until

this is completed.

CAMPUS VEHICLE EXPECTATIONS

31. Personal vehicles must be parked in the perimeter parking lots or garages. Temporary parking permits can be obtained at the Contractor's expense at the USC Parking Office located in the Pendleton Street parking garage.
32. All motorized vehicle traffic on USC walkways and landscape areas must be approved by the USC Project Manager and Parking Division, have a USC parking placard, and be parked within the approved laydown area. Violators may be subject to ticketing, towing and fines.
33. All motorized vehicles that leak or drip liquids are prohibited from traveling or parking on walks or landscaped areas.
34. Drivers of equipment or motor vehicles that damage university hardscape or landscape will be held responsible for damages and restoration expense.
35. All vehicles parked on landscape, hardscape, or in the process of service delivery, must display adequate safety devices, i.e. flashing lights, cones, signage, etc.
36. All drivers of equipment and vehicles shall be respectful of University landscape, equipment, structures, fixtures and signage.
37. All incidents of property damage shall be reported to Parking Services or the Work Management Center.



TREE CANOPY DRIPLINE:
SEE NOTE #2.

2½" O.D. GALV. FENCEPOST

CHAIN LINK FENCE PANEL

PROVIDE 4" HARDWOOD MULCH AT TREE PROTECTION AREA UPON RECOMMENDATION OF USC ARBORIST

FENCE POSTS TO BE SET INTO GROUND; MARK POST LOCATIONS FOR REVIEW AND APPROVAL BY USC ARBORIST PRIOR TO INSTALLATION. SEE NOTE #4.

NOTES:

1. PROVIDE PROTECTION FENCING FOR ALL TREES WITHIN AREA OF DISTURBANCE AND CONSTRUCTION ACCESS.
2. PROTECTION FENCING SHALL BE IN PLACE PRIOR TO BEGINNING CONSTRUCTION.
3. PROTECTION FENCING TO BE PLACED AT THE OUTSIDE OF THE CANOPY DRIPLINE, OR AT A DISTANCE OF ONE FOOT PER ONE INCH OF TREE DIAMETER, MEASURED AT BREAST HEIGHT, WHICHEVER IS LARGER, UNLESS OTHERWISE INDICATED ON LANDSCAPE PLAN OR APPROVED BY UNIVERSITY ARBORIST.
4. IN-GROUND POSTS ARE STANDARD. IF EXISTING ROOTS, UTILITIES OR PAVEMENT PRECLUDE USE OF IN-GROUND POSTS, FOOTED STANDS ARE ACCEPTABLE. SAND BAGS SHALL BE PLACED ON THE INSIDE OF FENCE.
5. DAMAGE TO ANY TREES DURING CONSTRUCTION SHALL BE ASSESSED BY UNIVERSITY ARBORIST AND THE UNIVERSITY ARBORIST SHALL STIPULATE WHAT ACTION WILL BE TAKEN FOR REMEDIATION OF DAMAGE. THE COST OF ANY AND ALL REMEDIATION WILL BE ASSUMED BY CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
6. DISTURBANCE OF ROOT ZONE UNDER DRIPLINE OF TREE, INCLUDING COMPACTION OF SOIL, CUTTING OR FILLING OR STORAGE OF MATERIALS SHALL QUALIFY AS DAMAGE AND SUBJECT TO REMEDIATION.

TREE PROTECTION FENCING (IN-GROUND) WITH SCREENING

NO SCALE REVISED 8.28.14

Project Name: USC Lancaster Bradley Hall Physics Lab Upgrades

Project Number: **H37-9519**

University of South Carolina

CONTRACTOR'S ONE YEAR GUARANTEE

STATE OF _____

COUNTY OF _____

WE _____
as General Contractor on the above-named project, do hereby guarantee that all work executed under the requirements of the Contract Documents shall be free from defects due to faulty materials and /or workmanship for a period of one (1) year from date of acceptance of the work by the Owner and/or Architect/Engineer; and hereby agree to remedy defects due to faulty materials and/or workmanship, and pay for any damage resulting wherefrom, at no cost to the Owner, provided; however, that the following are excluded from this guarantee;

Defects or failures resulting from abuse by Owner.

Damage caused by fire, tornado, hail, hurricane, acts of God, wars, riots, or civil commotion.

[Name of Contracting Firm]

*By _____

Title _____

*Must be executed by an office of the Contracting Firm.

SWORN TO before me this _____ day of _____, 2____ (seal)

_____ State

My commission expires _____

SE-355
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that *(Insert full name or legal title and address of Contractor)*

Name: _____
Address: _____

hereinafter referred to as “Contractor”, and *(Insert full name and address of principal place of business of Surety)*

Name: _____
Address: _____

hereinafter called the “surety”, are jointly and severally held and firmly bound unto *(Insert full name and address of Agency)*

Name: University of South Carolina
Address: 1300 Pickens Street
Columbia, South Carolina 29208

hereinafter referred to as “Agency”, or its successors or assigns, the sum of _____ (\$ _____), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Agency to construct

State Project Name: USC Lancaster Bradley Hall Physics Lab Upgrades

State Project Number: H37-9519

Brief Description of Awarded Work: Convert a physics lab to a chemistry lab by replacing lab benches, providing snorkel hoods, rework electrical, plumbing and gases to the benches. Required modifications to the mechanical, plumbing and electrical systems

in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: GMK Associates, Inc.

Address: 1201 Main Street, Suite 2100
Columbia, South Carolina 29201

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this _____ **day of** _____, **2** _____
(shall be no earlier than Date of Contract)

BOND NUMBER _____

CONTRACTOR

SURETY

By: _____
(Seal)

By: _____
(Seal)

Print Name: _____

Print Name: _____

Print Title: _____

Print Title: _____
(Attach Power of Attorney)

Witness: _____

Witness: _____

(Additional Signatures, if any, appear on attached page)

SE-355**PERFORMANCE BOND****NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:**

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency for the full and faithful performance of the contract, which is incorporated herein by reference.
2. If the Contractor performs the contract, the Surety and the Contractor have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.
3. The Surety's obligation under this Bond shall arise after:
 - 3.1 The Agency has notified the Contractor and the Surety at the address described in paragraph 10 below, that the Agency is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If the Agency, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the Agency's right, if any, subsequently to declare a Contractor Default; or
 - 3.2 The Agency has declared a Contractor Default and formally terminated the Contractor's right to complete the Contract.
4. The Surety shall, within 15 days after receipt of notice of the Agency's declaration of a Contractor Default, and at the Surety's sole expense, take one of the following actions:
 - 4.1 Arrange for the Contractor, with consent of the Agency, to perform and complete the Contract; or
 - 4.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
 - 4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Agency for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the Agency and the contractor selected with the Agency's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the Agency the amount of damages as described in paragraph 7 in excess of the Balance of the Contract Sum incurred by the Agency resulting from the Contractor Default; or
 - 4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and:
 - 4.4.1 After investigation, determine the amount for which it may be liable to the Agency and, within 60 days of waiving its rights under this paragraph, tender payment thereof to the Agency; or
 - 4.4.2 Deny liability in whole or in part and notify the Agency, citing the reasons therefore.
5. Provided Surety has proceeded under paragraphs 4.1, 4.2, or 4.3, the Agency shall pay the Balance of the Contract Sum to either:
 - 5.1 Surety in accordance with the terms of the Contract; or
 - 5.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.
 - 5.3 The balance of the Contract Sum due either the Surety or another contractor shall be reduced by the amount of damages as described in paragraph 7.
6. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond 15 days after receipt of written notice from the Agency to the Surety demanding that the Surety perform its obligations under this Bond, and the Agency shall be entitled to enforce any remedy available to the Agency.
 - 6.1 If the Surety proceeds as provided in paragraph 4.4 and the Agency refuses the payment tendered or the Surety has denied liability, in whole or in part, then without further notice the Agency shall be entitled to enforce any remedy available to the Agency.
 - 6.2 Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the Dispute Resolution process defined in the Contract Documents and the laws of the State of South Carolina.
 7. After the Agency has terminated the Contractor's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Agency shall be those of the Contractor under the Contract, and the responsibilities of the Agency to the Surety shall those of the Agency under the Contract. To a limit of the amount of this Bond, but subject to commitment by the Agency of the Balance of the Contract Sum to mitigation of costs and damages on the Contract, the Surety is obligated to the Agency without duplication for:
 - 7.1 The responsibilities of the Contractor for correction of defective Work and completion of the Contract; and
 - 7.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and
 - 7.3 Damages awarded pursuant to the Dispute Resolution Provisions of the Contract. Surety may join in any Dispute Resolution proceeding brought under the Contract and shall be bound by the results thereof; and
 - 7.4 Liquidated Damages, or if no Liquidated Damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the Contractor.
 8. The Surety shall not be liable to the Agency or others for obligations of the Contractor that are unrelated to the Contract, and the Balance of the Contract Sum shall not be reduced or set-off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Agency or its heirs, executors, administrators, or successors.
 9. The Surety hereby waives notice of any change, including changes of time, to the contract or to related subcontracts, purchase orders and other obligations.
 10. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the address shown on the signature page.
 11. Definitions
 - 11.1 Balance of the Contract Sum: The total amount payable by the Agency to the Contractor under the Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts to be received by the Agency in settlement of insurance or other Claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.
 - 11.2 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform the Contract or otherwise to comply with the terms of the Contract.

SE-357
LABOR & MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that *(Insert full name or legal title and address of Contractor)*

Name: _____
Address: _____

hereinafter referred to as “Contractor”, and *(Insert full name and address of principal place of business of Surety)*

Name: _____
Address: _____

hereinafter called the “surety”, are jointly and severally held and firmly bound unto *(Insert full name and address of Agency)*

Name: University of South Carolina
Address: 1300 Pickens Street
Columbia, South Carolina 29208

hereinafter referred to as “Agency”, or its successors or assigns, the sum of _____ (\$ _____), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Agency to construct

State Project Name: USC Lancaster Bradley Hall Physics Lab Upgrades

State Project Number: H37-9519

Brief Description of Awarded Work: Convert a physics lab to a chemistry lab by replacing lab benches, providing snorkel hoods, rework electrical, plumbing and gases to the benches. Required modifications to the mechanical, plumbing and electrical systems

in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: GMK Associates, Inc.

Address: 1201 Main Street, Ste. 2100
Columbia, South Carolina 2921

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Labor & Material Payment Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this _____ **day of** _____, **2** _____ **BOND NUMBER** _____
(shall be no earlier than Date of Contract)

CONTRACTOR

By: _____
(Seal)

Print Name: _____

Print Title: _____

Witness: _____

SURETY

By: _____
(Seal)

Print Name: _____

Print Title: _____
(Attach Power of Attorney)

Witness: _____

(Additional Signatures, if any, appear on attached page)

SE-357**LABOR & MATERIAL PAYMENT BOND****NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:**

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency to pay for all labor, materials and equipment required for use in the performance of the Contract, which is incorporated herein by reference.
 2. With respect to the Agency, this obligation shall be null and void if the Contractor:
 - 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants; and
 - 2.2 Defends, indemnifies and holds harmless the Agency from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract.
 3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.
 4. With respect to Claimants, and subject to the provisions of Title 29, Chapter 5 and the provisions of §11-35-3030(2)(c) of the SC Code of Laws, as amended, the Surety's obligation under this Bond shall arise as follows:
 - 4.1 Every person who has furnished labor, material or rental equipment to the Contractor or its subcontractors for the work specified in the Contract, and who has not been paid in full therefore before the expiration of a period of ninety (90) days after the date on which the last of the labor was done or performed by him or material or rental equipment was furnished or supplied by him for which such claim is made, shall have the right to sue on the payment bond for the amount, or the balance thereof, unpaid at the time of institution of such suit and to prosecute such action for the sum or sums justly due him.
 - 4.2 A remote claimant shall have a right of action on the payment bond upon giving written notice by certified or registered mail to the Contractor within ninety (90) days from the date on which such person did or performed the last of the labor or furnished or supplied the last of the material or rental equipment upon which such claim is made.
 - 4.3 Every suit instituted upon a payment bond shall be brought in a court of competent jurisdiction for the county or circuit in which the construction contract was to be performed, but no such suit shall be commenced after the expiration of one year after the day on which the last of the labor was performed or material or rental equipment was supplied by the person bringing suit.
 5. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:
 - 5.1 Send an answer to the Claimant, with a copy to the Agency, within sixty (60) days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
 - 5.2 Pay or arrange for payment of any undisputed amounts.
 - 5.3 The Surety's failure to discharge its obligations under this paragraph 5 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a claim. However, if the Surety fails to discharge its obligations under this paragraph 5, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs to recover any sums found to be due and owing to the Claimant.
 6. Amounts owed by the Agency to the Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the Contractor furnishing and the Agency accepting this Bond, they agree that all funds earned by the contractor in the performance of the Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Agency's prior right to use the funds for the completion of the Work.
 7. The Surety shall not be liable to the Agency, Claimants or others for obligations of the Contractor that are unrelated to the Contract. The Agency shall not be liable for payment of any costs or expenses of any claimant under this bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
 8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.
 9. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the Agency or the contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
 10. By the Contractor furnishing and the Agency accepting this Bond, they agree that this Bond has been furnished to comply with the statutory requirements of the South Carolina Code of Laws, as amended, and further, that any provision in this Bond conflicting with said statutory requirements shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.
 11. Upon request of any person or entity appearing to be a potential beneficiary of this bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.
 12. Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the laws of the State of South Carolina.
- 13. DEFINITIONS**
- 13.1 Claimant: An individual or entity having a direct contract with the Contractor or with a Subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the Contractor and the Contractor's Subcontractors, and all other items for which a mechanic's lien might otherwise be asserted.
 - 13.2 Remote Claimant: A person having a direct contractual relationship with a subcontractor of the Contractor or subcontractor, but no contractual relationship expressed or implied with the Contractor.
 - 13.3 Contract: The agreement between the Agency and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

SE-380

CHANGE ORDER NO.: _____

CHANGE ORDER TO DESIGN-BID-BUILD CONSTRUCTION CONTRACT

AGENCY: University of South Carolina

PROJECT NAME: USC Lancaster Bradley Hall Physics Lab Upgrades

PROJECT NUMBER: H37-9519

CONTRACTOR: _____ CONTRACT DATE: _____

This Contract is changed as follows: *(Insert description of change in space provided below)*

ADJUSTMENTS IN THE CONTRACT SUM:

1. Original Contract Sum:		\$
2. Change in Contract Sum by previously approved Change Orders:		
3. Contract Sum prior to this Change Order		\$ 0.00
4. Amount of this Change Order:		
5. New Contract Sum, including this Change Order:		\$ 0.00

ADJUSTMENTS IN THE CONTRACT TIME:

1. Original Substantial Completion Date:		
2. Sum of previously approved increases and decreases in Days:		Days
3. Change in Days for this Change Order		Days
4. New Substantial Completion Date:		

CONTRACTOR ACCEPTANCE:

BY: _____ Date: _____
(Signature of Representative)

Print Name of Representative: _____

A/E RECOMMENDATION FOR ACCEPTANCE:

BY: _____ Date: _____
(Signature of Representative)

Print Name or Representative: _____

AGENCY ACCEPTANCE AND CERTIFICATION:

BY: _____ Date: _____
(Signature of Representative)

Print Name of Representative: _____

Change is within Agency Construction Contract Change Order Certification of: \$ _____ Yes No

AUTHORIZED BY: _____ DATE: _____
(OSE Project Manager)

SUBMIT THE FOLLOWING TO OSE

1. SE-380, fully completed and signed by the Contractor, A/E and Agency;
2. Detailed back-up information, with OH&P shown, from the Contractor/Subcontractor(s) that justifies the costs and schedule changes shown.
3. If any item exceeds Agency certification, OSE will authorize the SE-380 and return to Agency.

SECTION 01 1000 - SUMMARY

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: USC Lancaster Bradley Hall Physics Lab Upgrades
- B. Owner's Name: University of South Carolina.
- C. Architect's Name: GMk Associates, Inc..
- D. The Project consists of the alteration of a physics lab to a chemistry lab by replacing lab benches, providing snorkel hoods, rework electrical, plumbing and gases to the benches. Required modifications to the mechanical, plumbing and electrical systems.

1.02 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 5200 - Agreement Form.

1.03 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of demolition and removal work is indicated on drawings and specified in Section 02 4100.
- B. Scope of alterations work is indicated on drawings.
- C. Plumbing: Alter existing system and add new construction, keeping existing in operation.
- D. HVAC: Alter existing system and add new construction, keeping existing in operation.
- E. Electrical Power and Lighting: Alter existing system and add new construction, keeping existing in operation.

1.04 WORK BY OWNER

- A. Owner has awarded a contract for supply of the lab casework which includes the benches, tops and plumbing fixtures. The contractor will be responsible for installation of the casework and final tie ins to plumbing and electrical infrastructure.
- B. Owner will supply and install the following:
- C. Owner will supply the following for installation by Contractor:

1.05 OWNER OCCUPANCY

- A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Owner intends to occupy the Project upon Substantial Completion.
- C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.

1.06 CONTRACTOR USE OF SITE AND PREMISES

- A. Arrange use of site and premises to allow:
 - 1. Owner occupancy.
 - 2. Use of site and premises by the public.
- B. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the building is unoccupied.
 - 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.

3. Prevent accidental disruption of utility services to other facilities.

1.07 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2000 - PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Correlation of Contractor submittals based on changes.
- E. Procedures for preparation and submittal of application for final payment.

1.02 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Forms filled out by hand will not be accepted.
- C. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- D. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.
- E. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, with each Application For Payment.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- C. Forms filled out by hand will not be accepted.
- D. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place and Stored Materials under this Application.
 - 6. Authorized Change Orders.
 - 7. Total Completed and Stored to Date of Application.
 - 8. Percentage of Completion.
 - 9. Balance to Finish.
 - 10. Retainage.
- E. Execute certification by signature of authorized officer.
- F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- H. Submit one electronic and three hard-copies of each Application for Payment.
- I. Include the following with the application:
 - 1. Transmittal letter as specified for submittals in Section 01 3000.
 - 2. Construction progress schedule, revised and current as specified in Section 01 3000.
 - 3. Partial release of liens from major subcontractors and vendors.
- J. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.04 MODIFICATION PROCEDURES

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to the Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- C. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 2. Promptly execute the change.
- D. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change. Contractor shall prepare and submit a fixed price quotation within 3 days.
- E. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 6000.
- F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
 3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
 4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- G. Substantiation of Costs: Provide full information required for evaluation.
 1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- H. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

- J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- K. Promptly enter changes in Project Record Documents.

1.05 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
 - 1. All closeout procedures specified in Section 01 7000.

END OF SECTION

SECTION 02 2223 - MINOR DEMOLITION FOR REMODELING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal of designated building equipment and fixtures.
- B. Removal of designated construction.
- C. Disposal of materials.
- D. Identification of utilities.

1.02 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Project Record Documents: Accurately record actual locations of capped utilities.
 - 1. Indicate unanticipated structural, electrical, or mechanical conditions.

1.03 REGULATORY REQUIREMENTS

- A. Conform to applicable code for demolition work, dust control, products requiring electrical disconnection and re-connection .
- B. Obtain required permits from authorities.
- C. Do not close or obstruct egress from any building exit or site exit.
- D. Do not disable or disrupt building fire or life safety systems without 5 days prior written notice to Owner.
- E. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered.

1.04 SCHEDULING

- A. Schedule work under the provisions of Section 01325.
- B. Arrange schedule so as not to interfere with the Owner's operations.
- C. Schedule work to coincide with new construction.
- D. Describe demolition removal procedures and schedule.

1.05 PROJECT CONDITIONS

- A. Conduct demolition to minimize interference with adjacent and occupied building areas.
- B. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.
- C. Occupancy:
 - 1. The Owner will continue to occupy portions of the existing building.
 - 2. Adjacent spaces will not be vacated during demolition activities.
- D. Existing Conditions:
 - 1. After the project is begun, the Contractor is responsible for the condition of structures to be demolished. The Owner does not warrant that the condition of structures to be demolished will not have changed since the time of inspection for bidding purposes.
- E. Unforeseen Conditions: Should unforeseen conditions be encountered that affect design or function of project, investigate fully and submit an accurate, detailed, written report to the architect. While awaiting the architect's response, reschedule operations if necessary to avoid delay of overall project.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

- A. Survey existing conditions and correlate with drawings and specifications to determine extent of demolition required.
- B. Insofar as is practical, arrange operations to reveal unknown or concealed structural conditions for examination and verification before removal or demolition.
- C. Perform continuing surveys as the work progresses to detect hazards resulting from demolition or construction activities.
- D. Verify actual conditions to determine in advance whether removal or demolition of any element will result in structural deficiency, overloading, failure, or unplanned collapse.

3.02 PREPARATION

- A. Provide for the protection of persons passing around or through the area of demolition.
- B. Erect and maintain weatherproof closures for exterior openings.
- C. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued building occupancy. Insulate to provide noise protection to occupied areas.
- D. Construct temporary partitions in a manner at least equal to the following (or superior, if necessary to provide effective protection specified):
 - 1. Gypsum-board surfaces adjacent to occupied areas, with joints taped.
- E. Protect existing materials and equipment that are not to be demolished.
- F. Notify affected utility companies before starting work and comply with their requirements.
- G. Mark location and termination of utilities.
- H. Provide appropriate temporary signage including signage for exit or building egress.
- I. Damages: Without cost to the Owner and without delay, repair any damages caused to facilities to remain.

3.03 POLLUTION CONTROLS

- A. Control as much as practical the spread of dust and dirt.
- B. Observe environmental protection regulations.
- C. Do not allow water usage that results in freezing or flooding.
- D. Do not allow adjacent improvements to remain to become soiled by demolition operations.

3.04 DEMOLITION

- A. Disconnect, remove, and identify designated utilities within demolition areas.
- B. Demolish in an orderly and careful manner. Protect existing supporting structural members.
- C. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.
- D. Remove materials as demolition progresses. Upon completion of demolition, leave areas in clean condition.
- E. Remove: Unless items are otherwise indicated to be reinstalled or salvaged, remove and scrap.
- F. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare for service; reinstall in the same location (or in the location indicated).
- G. Remove and Install New: Remove and dispose of items indicated and install new items in the same location (or in the location indicated).

- H. Remove and Salvage: Items indicated to be salvaged will remain the Owner's property. Carefully remove and clean items indicated to be salvaged; pack or crate to protect against damage; identify contents of containers; deliver to the locations indicated.
- I. Remove and Scrap: Remove and dispose of items indicated.
 - 1. All demolished or removed items and materials shall be considered scrap except for those indicated to remain, those indicated to be reinstalled, and those indicated to be salvaged.
 - 2. Items of value to the contractor:
 - a. Do not store removed items on site.
- J. Existing to Remain: Construction or items indicated to remain shall be protected against damage during demolition operations. Where practicable, and with the Architect's permission, the Contractor may elect to remove items to a suitable storage location during demolition and then properly clean and reinstall the items.
- K. Detailed requirements for cutting are specified under cutting and patching in Division 1.
- L. Perform work in a systematic manner.
- M. Demolish and remove existing construction only to the extent required by new construction and as indicated in the contract documents.
- N. Perform selective demolition using methods which are least likely to damage work to remain and which will provide proper surfaces for patching.
- O. Remove debris daily.
- P. Use any methods permitted by governing regulations and the requirements of the contract documents.

3.05 REPAIRS AND PATCHING

- A. Perform repairs in accordance with patching requirements specified in Division 1 under cutting and patching.

3.06 CLEANING

- A. Remove tools and equipment. Dispose of scrap.
- B. Broom clean interior areas.
- C. Clean soil, smudges, and dust from surfaces to remain.
- D. Leave exterior areas free of debris.
- E. Return structures and surfaces to remain to condition existing prior to commencement of demolition.

END OF SECTION

SECTION 01 2500 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.02 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - a. Unavailability.
 - b. Regulatory changes.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
 - a. Substitution requests offering advantages solely to the Contractor will not be considered.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. A Substitution Request for specified installer constitutes a representation that the submitter:
 - 1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Note explicitly any non-compliant characteristics.
- D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. No specific form is required. Contractor's Substitution Request documentation must include the following:
 - a. Project Information:
 - 1) Official project name and number, and any additional required identifiers established in Contract Documents.
 - 2) Owner's, Architect's, and Contractor's names.
 - b. Substitution Request Information:
 - 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
 - 2) Indication of whether the substitution is for cause or convenience.
 - 3) Issue date.

- 4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
 - 5) Description of Substitution.
 - 6) Reason why the specified item cannot be provided.
 - 7) Differences between proposed substitution and specified item.
 - 8) Description of how proposed substitution affects other parts of work.
 - c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
 - 1) Physical characteristics.
 - 2) In-service performance.
 - 3) Expected durability.
 - 4) Visual effect.
 - 5) Sustainable design features.
 - 6) Warranties.
 - 7) Other salient features and requirements.
 - 8) Include, as appropriate or requested, the following types of documentation:
 - (a) Product Data:
 - (b) Samples.
 - (c) Certificates, test, reports or similar qualification data.
 - (d) Drawings, when required to show impact on adjacent construction elements.
 - d. Impact of Substitution:
 - 1) Savings to Owner for accepting substitution.
 - 2) Change to Contract Time due to accepting substitution.
- E. Limit each request to a single proposed substitution item.
1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period, and the documents required.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Architect will consider requests for substitutions only within 15 days after date of Agreement.
- B. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- C. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 3. Bear the costs engendered by proposed substitution of:
 - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
 - b. Other construction by Owner.
 - c. Other unanticipated project considerations.
- D. Substitutions will not be considered under one or more of the following circumstances:
1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.

2. Without a separate written request.
3. When acceptance will require revisions to the Contract Documents.

3.04 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.
 1. Architect's decision following review of proposed substitution will be noted on the submitted form.

3.05 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.06 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

END OF SECTION

SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Contractor's daily reports.
- G. Progress photographs.
- H. Submittals for review, information, and project closeout.
- I. Number of copies of submittals.
- J. Requests for Interpretation (RFI) procedures.
- K. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 6000 - Product Requirements: General product requirements.

1.03 REFERENCE STANDARDS

- A. AIA G716 - Request for Information; 2004.

1.04 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
 - 1. Requests for Interpretation (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
- B. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.

4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 5. Designation of personnel representing the parties to Contract and Architect.
 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 7. Scheduling.
- C. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.02 SITE MOBILIZATION MEETING

- A. Schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
1. Contractor.
 2. Owner.
 3. Architect.
 4. Contractor's superintendent.
 5. Major subcontractors.
- C. Agenda:
1. Use of premises by Owner and Contractor.
 2. Owner's requirements.
 3. Construction facilities and controls provided by Owner.
 4. Temporary utilities provided by Owner.
 5. Survey and building layout.
 6. Security and housekeeping procedures.
 7. Schedules.
 8. Application for payment procedures.
 9. Procedures for testing.
 10. Procedures for maintaining record documents.
 11. Requirements for start-up of equipment.
 12. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

- A. Attendance Required:
1. Contractor.
 2. Owner.
 3. Architect.
 4. Contractor's superintendent.
 5. Major subcontractors.
- B. Agenda:
1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Maintenance of progress schedule.
 7. Corrective measures to regain projected schedules.
 8. Planned progress during succeeding work period.
 9. Maintenance of quality and work standards.
 10. Effect of proposed changes on progress schedule and coordination.
 11. Other business relating to work.

- C. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 CONSTRUCTION PROGRESS SCHEDULE

- A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- C. Within 10 days after joint review, submit complete schedule.
- D. Submit updated schedule with each Application for Payment.

3.05 DAILY CONSTRUCTION REPORTS

- A. Include only factual information. Do not include personal remarks or opinions regarding operations and/or personnel.
- B. Prepare a daily construction report recording the following information concerning events at Project site and project progress:
 - 1. Date.
 - 2. High and low temperatures, and general weather conditions.
 - 3. List of subcontractors at Project site.
 - 4. List of separate contractors at Project site.
 - 5. Approximate count of personnel at Project site.
 - a. Include a breakdown for supervisors, laborers, journeymen, equipment operators, and helpers.
 - 6. Major equipment at Project site.
 - 7. Material deliveries.
 - 8. Safety, environmental, or industrial relations incidents.
 - 9. Meetings and significant decisions.
 - 10. Unusual events (submit a separate special report).
 - 11. Stoppages, delays, shortages, and losses. Include comparison between scheduled work activities (in Contractor's most recently updated and published schedule) and actual activities. Explain differences, if any. Note days or periods when no work was in progress and explain the reasons why.
 - 12. Emergency procedures.
 - 13. Directives and requests of Authority(s) Having Jurisdiction (AHJ).
 - 14. Change Orders received and implemented.
 - 15. Testing and/or inspections performed.
 - 16. List of verbal instruction given by Owner and/or Architect.
 - 17. Signature of Contractor's authorized representative.

3.06 PROGRESS PHOTOGRAPHS

3.07 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 - 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.
 - 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.

- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format and with content acceptable to Owner.
 3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
1. Include in each request Contractor's signature attesting to good faith effort to determine from the Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 6000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
 - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 2. Owner's, Architect's, and Contractor's names.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Issue date, and requested reply date.
 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 2. Note dates of when each request is made, and when a response is received.
 3. Highlight items requiring priority or expedited response.

4. Highlight items for which a timely response has not been received to date.
 5. Identify and include improper or frivolous RFIs.
- H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.08 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
1. Submit at the same time as the preliminary schedule specified in Section - 01 3216 - Construction Progress Schedule.
 2. Coordinate with Contractor's construction schedule and schedule of values.
 3. Format schedule to allow tracking of status of submittals throughout duration of construction.
 4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
 5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
 - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.09 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.10 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:

1. Design data.
2. Certificates.
3. Test reports.
4. Inspection reports.
5. Manufacturer's instructions.
6. Manufacturer's field reports.
7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

3.11 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.12 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 1. After review, produce duplicates.
 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.13 SUBMITTAL PROCEDURES

- A. General Requirements:
 1. Use a separate transmittal for each item.
 2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
 3. Transmit using approved form.
 - a. Use Contractor's form, subject to prior approval by Architect.
 4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
 5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
 6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
 7. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Send submittals in electronic format via email to Architect.
 8. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

- b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
 - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
 9. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 10. Provide space for Contractor and Architect review stamps.
 11. When revised for resubmission, identify all changes made since previous submission.
 12. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
 13. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
 14. Submittals not requested will not be recognized or processed.
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
 2. Collect required information into a single submittal.
 3. Submit concurrently with related shop drawing submittal.
 4. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related work.
 2. Do not reproduce the Contract Documents to create shop drawings.
 3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items together as single package.
 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

3.14 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's and consultants' actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "Approved", or language with same legal meaning.
 - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
 - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
 - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
 - 1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.
 - 2) Non-responsive resubmittals may be rejected.
 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.

- 2) Non-responsive resubmittals may be rejected.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.
- E. Architect's and consultants' actions on items submitted for information:
 - 1. Items for which no action was taken:
 - a. "Received" - to notify the Contractor that the submittal has been received for record only.
 - 2. Items for which action was taken:
 - a. "Reviewed" - no further action is required from Contractor.

END OF SECTION

SECTION 01 3216 - CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

1.02 SUBMITTALS

- A. Within 10 days after date of Agreement, submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

END OF SECTION

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. References and standards.
- B. Submittals.
- C. Mock-ups.
- D. Control of installation.
- E. Tolerances.
- F. Manufacturers' field services.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 - 1. Submit report within 10 days of observation to Architect for information.
 - 2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.03 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

- A. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- B. Accepted mock-ups shall be a comparison standard for the remaining Work.
- C. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.05 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Procedures for Owner-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 15 days after date of Agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
 - 1. Containing lead, cadmium, or asbestos.
- C. Where other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01 6116.
 - 2. If wet-applied, have lower VOC content, as defined in Section 01 6116.

2.02 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.03 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.

3.02 OWNER-SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
 - 2. Arrange and pay for product delivery to site.
 - 3. On delivery, inspect products jointly with Contractor.
 - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 5. Arrange for manufacturers' warranties, inspections, and service.
- B. Contractor's Responsibilities:
 - 1. Review Owner reviewed shop drawings, product data, and samples.
 - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 - 3. Handle, store, install and finish products.
 - 4. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419.
 - 1. Structural Loading Limitations: Handle and store products and materials so as not to exceed static and dynamic load-bearing capacities of project floor and roof areas.
- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts.
- F. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- G. For exterior storage of fabricated products, place on sloped supports above ground.

- H. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- I. Comply with manufacturer's warranty conditions, if any.
- J. Do not store products directly on the ground.
- K. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- L. Prevent contact with material that may cause corrosion, discoloration, or staining.
- M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- N. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 7000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition.
- C. Cutting and patching.
- D. Cleaning and protection.
- E. Starting of systems and equipment.
- F. Demonstration and instruction of Owner personnel.
- G. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.

1.03 PROJECT CONDITIONS

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
 - 1. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
- C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
 - 1. Indoors: Limit conduct of especially noisy interior work to hours allotted by the owner.
- D. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from entering the building and damaging the work.

1.04 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.

- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.04 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.

- B. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove items indicated on drawings.
 - 2. Relocate items indicated on drawings.
 - 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- C. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. Provide temporary connections as required to maintain existing systems in service.
 - 4. Verify that abandoned services serve only abandoned facilities.
 - 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- D. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
- E. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
- F. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- G. Refinish existing surfaces as indicated:
 - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 - 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- H. Clean existing systems and equipment.
- I. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- J. Do not begin new construction in alterations areas before demolition is complete.
- K. Comply with all other applicable requirements of this section.

3.05 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.

- C. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-complying work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- J. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.06 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.07 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.08 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.09 DEMONSTRATION AND INSTRUCTION

- A. See Section 01 7900 - Demonstration and Training.
- B. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- E. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.10 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Testing, adjusting, and balancing HVAC systems: See Section 23 0593 - Testing, Adjusting, and Balancing for HVAC.

3.11 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
 - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- B. Use cleaning materials that are nonhazardous.
- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Clean filters of operating equipment.
- G. Clean debris from roofs, scuppers, overflow drains, area drains, and drainage systems.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.12 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to Architect and Owner.
- B. Accompany project manager on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

END OF SECTION

SECTION 01 7800 - CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Individual Product Sections: Specific requirements for operation and maintenance data.
- C. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 2. Field changes of dimension and detail.
 3. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 1. Product data, with catalog number, size, composition, and color and texture designations.
 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 1. Description of unit or system, and component parts.
 2. Identify function, normal operating characteristics, and limiting conditions.
 3. Include performance curves, with engineering data and tests.
 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 1. Include HVAC outdoor and exhaust air damper calibration strategy.

- a. Include provisions which ensure that full closure of dampers can be achieved.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Provide control diagrams by controls manufacturer as installed.
- J. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- K. Include test and balancing reports.
- L. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data, shop drawings, and other submittals.
 - c. Operation and maintenance data.
 - d. Field quality control data.
 - e. Photocopies of warranties and bonds.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.

- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

END OF SECTION

SECTION 01 7900 - DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

- A. Demonstration of products and systems where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. All software-operated systems.
 - 2. HVAC systems and equipment.
 - 3. Plumbing equipment.
 - 4. Electrical systems and equipment.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
 - 1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
 - 2. Finishes, including flooring, wall finishes, ceiling finishes.
 - 3. Fixtures and fittings.
 - 4. Items specified in individual product Sections.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstration may be combined with Owner personnel training if applicable.
- C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
 - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

- A. Conduct training on-site unless otherwise indicated.
- B. Owner will provide classroom and seating at no cost to Contractor.
- C. Provide training in minimum two hour segments.
- D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
 - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
 - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
 - 3. Typical uses of the O&M manuals.
- F. Product- and System-Specific Training:
 - 1. Review the applicable O&M manuals.
 - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.

3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
 4. Provide hands-on training on all operational modes possible and preventive maintenance.
 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
 6. Discuss common troubleshooting problems and solutions.
 7. Discuss any peculiarities of equipment installation or operation.
 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
 10. Review spare parts and tools required to be furnished by Contractor.
 11. Review spare parts suppliers and sources and procurement procedures.
- G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 07 8400 - FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems.
- B. Firestopping of all penetrations through fire barriers.
- C. Smokestopping of all penetrations through smoke barriers.
- D. Extent of fire and smoke barriers is indicated on drawings.
- E. All work of this section shall be performed by a single firm.
- F. Work Not Included: Repairing penetrations made in error and repairing penetrations which are too large to be sealed by the methods indicated; these are to be repaired using the original material of the construction.
- G. Products Furnished but Not Installed:
 - 1. Sleeves which are an integral part of the firestopping assembly but which must be set by installer of other construction.
- H. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2015.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).
- C. ASTM E1966 - Standard Test Method for Fire Resistive Joint Systems; 2007 (Reapproved 2011).
- D. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2015a.
- E. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013.
- F. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- G. ITS (DIR) - Directory of Listed Products; current edition.
- H. FM 4991 - Approval Standard for Firestop Contractors; 2013.
- I. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.
- J. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.
- K. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- L. UL (FRD) - Fire Resistance Directory; current edition.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with ASTM E 814 and ASTM E 119.

1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
 2. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
1. Approved by Factory Mutual Research under FM Standard 4991, Approval of Firestop Contractors .
 2. With minimum 3 years documented experience installing work of this type.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of products to minimize storage time at site.
- B. Deliver products to project site in original unopened containers bearing the name of the manufacturer, product name, type, and testing agency's identification mark.
- C. Store products in accordance with manufacturer's instructions.

1.06 MOCK-UP

- A. Install one firestopping assembly representative of each fire rating design required on project.
- B. Obtain approval of Architect before proceeding.
- C. If accepted, mock-up will represent minimum standard for the Work.
- D. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

1.07 SEQUENCING AND SCHEDULING

- A. Perform firestopping and smokestopping work after completion of work which penetrates fire and smoke barriers, but prior to covering up or eliminating access to the penetration. Coordinate with installers of such other work.

1.08 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 FIRESTOPPING - GENERAL REQUIREMENTS

- A. Manufacturers:
 1. A/D Fire Protection Systems Inc: www.adfire.com.
 2. 3M Fire Protection Products: www.3m.com/firestop.
 3. Hilti, Inc: www.us.hilti.com.
 4. Nelson FireStop Products: www.nelsonfirestop.com.
 5. Specified Technologies, Inc: www.stifirestop.com.
- B. Firestopping: Any material meeting requirements.
- C. Firestopping Materials with Volatile Content: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- D. Mold Resistance: Provide firestopping materials with mold and mildew resistance rating of 0 as determined by ASTM G21.
- E. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Perimeter Fire Containment Firestopping: Use any system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of the floor assembly.
 - 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
 - 2. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
 - 3. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
 - 4. Where floor assembly is not required to have a fire rating, provide systems that have been tested to show L Rating as indicated.
- B. Head-of-Wall Firestopping at Joints Between Non-Rated Floor and Fire-Rated Wall: Use any system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
 - 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
- C. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use any system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
 - 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
 - 2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
 - 3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated.
 - 4. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.
- D. Through Penetration Firestopping: Use any system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
 - 1. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
 - 2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
 - 3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated.
 - 4. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.

2.03 FIRESTOPPING SYSTEMS

- A. Firestopping: Any material meeting requirements.
 - 1. Fire Ratings: Use any system listed by UL or tested in accordance with ASTM E 814 that has F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and that meets all other specified requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.

- C. Install backing materials to arrest liquid material leakage.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authority having jurisdiction.
- C. Install labeling required by code.

3.04 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 9005 - JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sealants and joint backing.
- B. The sealing of joints indicated on schedule at the end of this section.
- C. The sealing of concealed joints in sound-retardant assemblies, including:
 - 1. Around all outlet boxes, thru the wall penetrations, between top and bottom stud runners and structure and where indicated on the drawings to reduce transmission of airborne sound.
- D. The sealing of other joints indicated on drawings.
- E. Joints of a nature similar to that of joints indicated on the schedule shall be sealed with same sealer, whether indicated on drawings to be sealed or not.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Samples: Submit two samples, illustrating sealant colors for selection.
- D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.
- E. Substrate Test Report for Each Sealer.
- F. Field Installation Test Reports.
- G. Certificates: For each sealer, provide manufacturer's certificate stating that the product complies with the specifications and is appropriate for the use it is being put to.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.
- C. Field Installation Tests: Before installation, test the adhesion of all sealers to actual substrates.
 - 1. Seal at least 5-foot lengths of joints and cure properly. Try to pull sealer out of joint by hand, by method recommended by sealer manufacturer.
 - 2. Select test joints representative of joints to be sealed by the product to be tested.
 - 3. Perform tests for each type of sealer used on exterior and each type of elastomeric sealant used on interior.
 - 4. Report acceptable results only.

1.04 MOCK-UP

- A. Provide mock-up of sealant joints in conjunction with window, wall, and adjacent materials under provisions of Section 01 4000.
- B. Construct mock-up with specified sealant types and with other components noted.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original containers or bundles with labels showing manufacturer, product name or designation, color, shelf life, and installation instructions.

1.06 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- B. Environmental Limitations: Do not install sealers if any of the following conditions exist:
 - 1. Air or substrate temperature exceeds the range recommended by sealer manufacturer or is below 40 degrees F (4.4 degrees C).
 - 2. Substrate is wet, damp, or covered with snow, ice, or frost.
- C. Dimensional Limitations: Do not install sealers if joint dimensions are less than or greater than that recommended by sealer manufacturer; notify the Architect and get sealer manufacturer's recommendations for alternative procedures.

PART 2 PRODUCTS

2.01 MATERIALS - GENERAL

- A. General: Provide only products which are recommended and approved by their manufacturer for the specific use to which they are put and which comply with all requirements of the contract documents.
 - 1. For each generic product, use only materials from one manufacturer.
 - 2. Provide only materials which are compatible with each other and with joint substrates.
 - 3. Colors of exposed sealers: To match Architect's samples.
- B. Products: The design is based on the product(s) listed for each generic type. Comparable products of the manufacturers listed will be considered for substitution.

2.02 MANUFACTURERS

- A. Silicone Sealants:
 - 1. Bostik Inc: www.bostik-us.com.
 - 2. Pecora Corporation: www.pecora.com.
 - 3. BASF Construction Chemicals-Building Systems: www.chemrex.com.
 - 4. Substitutions: Not permitted.
- B. Acrylic Emulsion Latex Sealants:
 - 1. Bostik Inc: www.bostik-us.com.
 - 2. Pecora Corporation: www.pecora.com.
 - 3. BASF Construction Chemicals-Building Systems: www.chemrex.com.

2.03 SEALANTS

- A. General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single component.
 - 1. Color: To be selected by Architect from manufacturer's standard range.
 - 2. Product: Dymeric 511 manufactured by Tremco, Inc.
- B. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
 - 1. Product: Tremco Butyl Sealant manufactured by Tremco, Inc.
- C. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
 - 1. Color: Colors as selected.
 - 2. Product: Tremco Acrylic Latex 834 manufactured by Tremco, Inc.
 - 3. Applications: Use for:
 - a. Joints between door and window frames and wall surfaces.
 - b. Other interior joints for which no other type of sealant is indicated.
- D. Acoustical Sealant for Concealed Locations:
 - 1. Product: Tremco Acoustical Sealant manufactured by Tremco, Inc.
 - 2. Applications: Use for concealed locations only:
 - a. Sealant bead between top stud runner and structure and between bottom stud track and floor. At penetrations through walls indicated as acoustic.

2.04 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces and joint openings are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.
 - 1. Masking Tape: Use masking tape to keep primers and sealers off of adjacent surfaces which would be damaged by contact or by cleanup. Remove tape as soon as practical.
- E. Install fillers where needed to provide proper joint depth or support for sealant backers.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Backers:
 - 1. Install backers at depth required to result in shape and depth of installed sealant which allows the most joint movement without failure.
 - a. Make backers continuous, without gaps, tears, or punctures.
 - b. Do not stretch or twist backers.
 - 2. If backers become wet or damp before installation of sealant, dry out thoroughly before proceeding.
- F. Install bond breaker where joint backing is not used.
- G. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- H. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- I. Tool joints concave.

3.04 CLEANING

- A. Clean adjacent soiled surfaces.

3.05 PROTECTION

- A. Protect sealants until cured.

END OF SECTION

SECTION 09 5100 - ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.
- C. Seismic grid restraint.

1.02 REFERENCE STANDARDS

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.
- C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2014.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.04 QUALITY ASSURANCE

- A. Seismic Grid Restraint: Design and install in accordance to International Building Code Section 1621.2.5.2.2 and CISCA 3-4.
- B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.05 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.
- B. In a timely manner, furnish to affected installers, attachment devices for incorporation into other work.
- C. Coordination Data: Prepare and distribute to affected installers, data necessary for coordination with related work. Include setting diagrams showing placement of attachment devices for acoustical ceiling hangers.
- D. Work above ceilings has been finished, tested, and approved.
- E. Coordinate ceiling system installation with work of other sections as required, including the following:
 - 1. Light fixtures.
 - 2. HVAC equipment.
 - 3. Fire suppression system components.
 - 4. Loudspeakers.
 - 5. Fire Alarm System Components.
 - 6. Partitions.
- F. Do not begin installation of ceiling system until building's normal operating temperature and humidity levels have been reached and will be maintained.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrong.com; or architect approved equal.
 - 2. Match existing ceiling tile. Coordinate with owner. .
 - 3. Substitutions: Not permitted.
- B. Acoustical Units - General: ASTM E1264, Class A.
- C. Glass Fiber Acoustical Panels: Mylar faced glass fiber, Wet-formed mineral fiber covered with soil resistant polyester film. Comply with the requirements of ASTM E 1264, Type IV, Form 2, Pattern GH; manufacturer's standard thickness, but not less than 5/8 inch thick. with the following characteristics:
 - 1. Size: 24 by 24 inches.
 - 2. Thickness: 1 inches.
 - 3. Light Reflectance: 89 percent, determined as specified in ASTM E1264.
 - 4. Edge: Square.
 - 5. Surface Color: White.
 - 6. Surface Pattern: Perforated, small holes.
 - 7. Suspension System: Exposed grid.

2.02 SUSPENSION SYSTEM(S)

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc; Product Prelude XL: www.armstrong.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required. Grids in toilet and utility rooms shall be aluminum, all others are to be electro-galvanized unless noted otherwise.
- C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
 - 1. Profile: Tee; 15/16 inch wide face.
 - 2. Construction: Double web.
 - 3. Finish: White color to match ceiling panels; standard smooth texture.
 - 4. Shall match existing.

2.03 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
 - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
 - 2. Shall match existing.
- C. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions under which products of this section are to be installed and verify that the work properly may commence.
- B. Verify existing conditions before starting work.
- C. Verify that layout of hangers will not interfere with other work.
- D. Verify that products furnished as work of this section, but not installed under this section, have been properly installed by the entity performing the installation.

3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636/C 636M, ASTM E 580/E 580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Layout: Position ceiling components to maximize use of full-sized acoustical units and to provide border units which are equal in size and shape at opposing ceiling edges. Use of acoustical units which are smaller than 1/2 full-width is prohibited at ceiling perimeters. Conform to reflected ceiling plans to greatest extent possible.
- D. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- F. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.
- G. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members. Do not allow hangers to contact any objects or materials in ceiling plenum which are not actual components of ceiling system.
 - 1. Splay hangers only where necessary to avoid obstacles. Provide counter splaying, bracing, or other acceptable devices to compensate for lateral stresses caused by splayed hangers.
 - 2. Install splay hangers or other means of seismic restraint as required to meet the requirements of International Building Code Section 1621.2.5.2.2, ASTM E 580, and CISCA 3-4.
 - 3. Do not attach hangers to piping, conduit, or duct. Provide carrying channel trapeze support where obstruction cannot be avoided by splaying hanger 45 degrees from vertical or less.
- H. Space hangers at not more than 48 inches on center and within 6 inches of ends of each direct-hung runner or carrying channel, unless indicated otherwise.
- I. Loop and tie wire hangers securely to building's structural members; to attachment devices indicated; or, where not indicated, to devices suitable for substrate and capable of permanently supporting ceiling weight without failure or deterioration.
- J. Level ceiling suspension system to tolerance of 1/8 inch in 12 feet, with cumulative tolerance not to exceed 1/4 inch. Bending or kinking of hangers is not allowed.
- K. Exposed (Lay-in) Grid Installation: Install grid members square, with ends of members securely interlocked. Remove and replace dented, bent, or kinked members.
- L. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- M. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- N. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- O. Do not eccentrically load system or induce rotation of runners.
- P. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Molding and trim attachment: Space screws not more than 16 inches on center and within 3 inches of ends of each trim-piece being installed. Install moldings and trim level with suspension system and within tolerance specified for suspension system.

2. Use longest practical lengths.
3. Miter corners and align butt joints carefully to form tight hairline joints.
4. Face-riveting of trim and moldings is not allowed.

3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 1. Cut to fit irregular grid and perimeter edge trim.
 2. Make field cut edges of same profile as factory edges.
- G. Where round obstructions occur, provide preformed closures to match perimeter molding.

3.04 ADJUST AND CLEAN

- A. Use ceiling manufacturer's recommended methods and materials to clean and touch-up exposed components of ceiling system.
- B. Replace ceiling system components which are discolored or damaged in any way, in a manner which results in the ceiling system showing no evidence of replacement work.

3.05 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 9000 - PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints and other coatings.
- C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Mechanical and Electrical:
 - a. In finished areas, paint all insulated and exposed pipes, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Non-metallic roofing and flashing.
 - 6. Stainless steel, anodized aluminum, bronze, terne, and lead items.
 - 7. Marble, granite, slate, and other natural stones.
 - 8. Floors, unless specifically so indicated.
 - 9. Ceramic and other tiles.
 - 10. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
 - 11. Glass.
 - 12. Acoustical materials, unless specifically so indicated.
 - 13. Concealed pipes, ducts, and conduits.

1.02 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of all products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, submit each color in each sheen available.

3. Allow 30 days for approval process, after receipt of complete samples by Architect.
4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.

D. Manufacturer's Instructions: Indicate special surface preparation procedures.

1.04 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.
- B. Provide panel, 4 feet long by 4 feet wide, illustrating special coating color, texture, and finish.
- C. Locate where directed.
- D. Mock-up may remain as part of the work.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.06 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Provide all paint and coating products from the same manufacturer to the greatest extent possible.
 1. In the event that a single manufacturer cannot provide all specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
 2. Substitution of MPI-approved products by a different manufacturer is preferred over substitution of unapproved products by the same manufacturer.
- C. Paints:
 1. Glidden Professional: www.gliddenprofessional.com.
 2. Benjamin Moore & Co: www.benjaminmoore.com/#sle.
 3. PPG Architectural Finishes, Inc: www.ppgaf.com/#sle.
 4. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
- D. Primer Sealers: Same manufacturer as top coats.
- E. Block Fillers: Same manufacturer as top coats.
- F. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.

1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 4. Supply each coating material in quantity required to complete entire project's work from a single production run.
 5. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Chemical Content: The following compounds are prohibited:
1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.
- E. Flammability: Comply with applicable code for surface burning characteristics.
- F. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- G. Colors: To be selected from manufacturer's full range of available colors.
1. Selection to be made by Architect after award of contract.
 2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
 3. Extend colors to surface edges; colors may change at any edge as directed by Architect.
 4. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - All Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry, uncoated steel, shop primed steel, galvanized steel, and aluminum.
1. Two top coats and one coat primer.
 2. Top Coat(s): MPI Institutional Low Odor/VOC Interior Latex; MPI #143-148.
 3. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
 4. Eggshell: MPI gloss level 3; use this sheen at walls.
 5. Semi-Gloss: MPI gloss level 5; use this sheen at hollow metal.
 6. Primer(s): As follows unless other primer is required or recommended by manufacturer of top coats:

- a. All Substrates: MPI #149, Institutional Low Odor/VOC Primer Sealer, unless a different primer is specified.
 - b. Concrete Masonry: MPI #4, Latex Block Filler; heavy coat squeegeed into pores.
 - c. Steel, Uncoated: MPI #107, Rust-Inhibitive Water Based Primer.
 - d. Steel -- Shop Primer: MPI #76, Quick Dry Alkyd Primer for Metal.
 - e. Galvanized Steel: MPI #134, Water Based Galvanized Primer.
 - f. Aluminum: MPI #95, Quick Dry Primer for Aluminum.
- B. Paint I-OP-FL - Concrete Floors Indicated to be Painted.
1. Two top coats and one coat primer.
 2. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
 3. Top Coat Product(s):
 - a. Sherwin-Williams ArmorSeal HS Polyurethane Floor Enamel with ArmorSeal 1000HS Epoxy Floor Enamel as primer.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of coatings until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 1. Gypsum Wallboard: 12 percent.
 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 3. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

- H. Concrete Floors and Traffic Surfaces to be Painted: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- I. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- J. Un corroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
- K. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- L. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.
- M. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's instructions.
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- G. Sand wood and metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finished coatings until completion of project.
- B. Touch-up damaged coatings after Substantial Completion.

END OF SECTION

SECTION 10 4400 - FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Accessories.

1.02 REFERENCE STANDARDS

- A. NFPA 10 - Standard for Portable Fire Extinguishers; 2017.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features.
- C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Ansul, a Tyco Business: www.ansul.com/#sle.
 - 2. Kidde, a unit of United Technologies Corp: www.kidde.com/#sle.
 - 3. Nystrom, Inc: www.nystrom.com/#sle.
- B. Fire Extinguisher Cabinets and Accessories:
 - 1. Activar Construction Products Group - JL Industries: www.activarcpg.com/#sle.
 - 2. Ansul, a Tyco Business: www.ansul.com/#sle.
 - 3. Kidde, a unit of United Technologies Corp: www.kidde.com/#sle.
 - 4. Larsen's Manufacturing Co: www.larsensmfg.com/#sle.
 - 5. Nystrom, Inc: www.nystrom.com/#sle.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 - 1. Class: A:B:C type.
 - 2. Size: 2.5 pound.
 - 3. Finish: Baked polyester powder coat, red color.
 - 4. Temperature range: Minus 40 degrees F to 120 degrees F.

2.03 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, chrome-plated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure rigidly in place.
- C. Place extinguishers on wall brackets.

3.03 SCHEDULES

- A. Lab 204 - 1 Multipurpose Dry Chemical Extinguisher on bracket. Coordinate location with owner.

END OF SECTION

SECTION 22 0553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nameplates.
- B. Pipe Markers.

1.02 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; The American Society of Mechanical Engineers; 2007.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2001 (Reapproved 2007).

1.03 SUBMITTALS

- A. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- C. Product Data: Provide manufacturers catalog literature for each product required.
- D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
- E. Project Record Documents: Record actual locations of tagged valves.
- F. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
 - 1. Spare parts lists
 - 2. Shop drawings and product data

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

- A. Piping: Pipe markers.
- B. Valves: Tags and ceiling tacks where located above lay-in ceiling.

2.02 MANUFACTURERS

- A. Brady Corporation: www.bradycorp.com.
- B. Champion America, Inc: www.Champion-America.com.
- C. Seton Identification Products: www.seton.com/aec.

2.03 NAMEPLATES

- A. Description: Laminated three-layer plastic with engraved letters.
 - 1. Letter Color: White.
 - 2. Letter Height: 1/4 inch.
 - 3. Background Color: Black.
 - 4. Plastic: Conform to ASTM D709.

2.04 TAGS

- A. Manufacturers:
 - 1. Advanced Graphic Engraving: www.advancedgraphicengraving.com/#sle.
 - 2. Brady Corporation: www.bradycorp.com/#sle.
 - 3. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com/#sle.
 - 4. Seton Identification Products: www.seton.com/#sle.

2.05 PIPE MARKERS

- A. Manufacturers:
 - 1. Brady Corporation: www.bradycorp.com/#sle.
 - 2. Kolbi Pipe Marker Co.: www.kolbipipemarkers.com/#sle.

3. MIFAB, Inc.: www.mifab.com/#sle.
 4. Seton Identification Products: www.seton.com/#sle.
- B. Comply with ASME A13.1.
- C. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

2.06 CEILING TACKS

- A. Manufacturers:
1. Craftmark: www.craftmarkid.com/#sle.
- B. Description: Steel with 3/4 inch diameter color coded head.

PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

- A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- D. Identify valves in main and branch piping with tags.
- E. Identify piping, concealed or exposed, with plastic pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

3.03 SCHEDULES

- A. Piping
1. All pipe identification shall be color coded in accordance with the following:
 - a. Domestic cold water - Blue
 - b. Domestic hot water - Red
 - c. Domestic hot water return - Beige
 - d. Natural Gas - Yellow
 - e. Compressed Air - Yellow
 - f. Laboratory vacuum - White

END OF SECTION

SECTION 22 0719 - PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping insulation.
- B. Jackets and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 22 1005 - Plumbing Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

- A. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2013.
- B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.
- C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2017.
- D. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2016a.
- E. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2018.
- F. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2013).
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- I. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.
- J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.06 FIELD CONDITIONS

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

- A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.

2.02 GLASS FIBER

- A. Manufacturers:
 - 1. Knauf Insulation: www.knaufusa.com.
 - 2. Johns Manville Corporation: www.jm.com.
 - 3. Owens Corning Corp: www.owenscorning.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: ASTM C547 and ASTM C 795; rigid molded, noncombustible.

1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
 2. Maximum service temperature: 850 degrees F.
 3. Maximum moisture absorption: 0.2 percent by volume.
- C. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturer:
1. Aeroflex USA, Inc: www.aeroflexusa.com/#sle.
 2. Armacell LLC: www.armacell.us/#sle.
 3. K-Flex USA LLC: www.kflexusa.com/#sle.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 3; use molded tubular material wherever possible.
1. Minimum Service Temperature: -40 degrees F.
 2. Maximum Service Temperature: 220 degrees F.
 3. Connection: Waterproof vapor barrier adhesive.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.03 SCHEDULES

- A. Plumbing Systems:
1. Domestic Hot Water Supply:
 - a. Glass Fiber Insulation:
 - 1) Thickness: 1 inch.
 2. Domestic Hot Water Recirculation:
 - a. Glass Fiber Insulation:
 - 1) Pipe Size Range: All sizes.
 - 2) Thickness: 1 inch.
 3. Domestic Cold Water Supply:
 - a. Glass Fiber Insulation:
 - 1) Thickness: 1 inch.

END OF SECTION

SECTION 22 0719 - PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping insulation.
- B. Jackets and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 22 1005 - Plumbing Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

- A. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2013.
- B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.
- C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2017.
- D. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2016a.
- E. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2018.
- F. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2013).
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- I. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.
- J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.06 FIELD CONDITIONS

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

- A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.

2.02 GLASS FIBER

- A. Manufacturers:
 - 1. Knauf Insulation: www.knaufusa.com.
 - 2. Johns Manville Corporation: www.jm.com.
 - 3. Owens Corning Corp: www.owenscorning.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: ASTM C547 and ASTM C 795; rigid molded, noncombustible.

1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
 2. Maximum service temperature: 850 degrees F.
 3. Maximum moisture absorption: 0.2 percent by volume.
- C. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturer:
1. Aeroflex USA, Inc: www.aeroflexusa.com/#sle.
 2. Armacell LLC: www.armacell.us/#sle.
 3. K-Flex USA LLC: www.kflexusa.com/#sle.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 3; use molded tubular material wherever possible.
1. Minimum Service Temperature: -40 degrees F.
 2. Maximum Service Temperature: 220 degrees F.
 3. Connection: Waterproof vapor barrier adhesive.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.03 SCHEDULES

- A. Plumbing Systems:
1. Domestic Hot Water Supply:
 - a. Glass Fiber Insulation:
 - 1) Thickness: 1 inch.
 2. Domestic Hot Water Recirculation:
 - a. Glass Fiber Insulation:
 - 1) Pipe Size Range: All sizes.
 - 2) Thickness: 1 inch.
 3. Domestic Cold Water Supply:
 - a. Glass Fiber Insulation:
 - 1) Thickness: 1 inch.

END OF SECTION

SECTION 22 1006 - PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Floor drains.
- B. Thermostatic mixing valves.

1.02 RELATED REQUIREMENTS

- A. Section 22 1005 - Plumbing Piping.

1.03 REFERENCE STANDARDS

- A. ASSE 1012 - Backflow Preventer with Intermediate Atmospheric Vent; 2009.
- B. PDI-WH 201 - Water Hammer Arresters; 2010.

1.04 SUBMITTALS

- A. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- B. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.
- C. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.
- D. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
- E. Operating instructions
- F. Maintenance instructions, including preventative and corrective maintenance.
- G. Copies of warranties
- H. Shop drawings and product data

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.01 DRAINS

- A. Manufacturers:
 - 1. George Fisher
 - 2. Zurn Industries, Inc: www.zurn.com/#sle.
 - 3. Orion

2.02 BACKFLOW PREVENTERS

- A. Manufacturers:
 - 1. Conbraco Industries: www.apollovalves.com/#sle.
 - 2. Valve Solutions, Inc.
 - 3. Watts Regulator Company: www.wattsregulator.com/#sle.
 - 4. Zurn Industries, Inc: www.zurn.com/#sle.

2.03 DOUBLE CHECK VALVE ASSEMBLIES

- A. Manufacturers:
 - 1. Ames
 - 2. Conbraco Industries: www.apollovalves.com/#sle.
 - 3. Watts Regulator Company: www.wattsregulator.com/#sle.
- B. Double Check Valve Assemblies:

1. ASSE 1012; Bronze body with corrosion resistant internal parts and stainless steel springs; two independently operating check valves with intermediate atmospheric vent.

2.04 VACUUM BREAKERS

- A. Manufacturers:
 1. T&S Brass
 2. Charlotte Pipe and Foundry
 3. Conbraco Industries: www.conbraco.com.
 4. Watts Regulator Company: www.wattsregulator.com.

2.05 WATER HAMMER ARRESTORS

- A. Manufacturers:
 1. Jay R. Smith Manufacturing Company: www.jayrsmith.com/#sle.
 2. Watts Regulator Company: www.wattsregulator.com/#sle.
 3. Zurn Industries, Inc: www.zurn.com/#sle.
- B. Water Hammer Arrestors:
 1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range -100 to 300 degrees F and maximum 250 psi working pressure.

2.06 MIXING VALVES

- A. Thermostatic Mixing Valves:
 1. Manufacturers:
 - a. Bradley Corporation. www.bradleycorp.com
 - b. Acorn
 - c. WATERSAVER
 2. Accessories:
 - a. Check valve on inlets.
 - b. Volume control shut-off valve on outlet.
 - c. Stem thermometer on outlet.
 - d. Strainer stop checks on inlets.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 22 1500 - GENERAL-SERVICE COMPRESSED-AIR SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe and Pipe Fittings.

1.02 RELATED REQUIREMENTS

- A. Section 22 0548 - Vibration and Seismic Controls for Plumbing Piping and Equipment.
- B. Section 22 0553 - Identification for Plumbing Piping and Equipment: Identification of piping system.

1.03 REFERENCE STANDARDS

- A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.
- B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.
- C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.
- D. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2013.
- E. ASME B31.1 - Power Piping; 2014.
- F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- G. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2017.
- H. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- I. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2016.
- J. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2016.
- K. NEMA MG 1 - Motors and Generators; 2017.
- L. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

- A. Product Data: Provide manufacturers catalog literature with capacity, weight, and electrical characteristics and connection requirements.
- B. Shop Drawings: Indicate piping system schematic with electrical characteristics and connection requirements.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- D. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
- E. Safety instructions
- F. Recommended spare parts
- G. Spare parts lists
- H. Operating instructions
- I. Maintenance instructions, including preventative and corrective maintenance.
- J. Copies of warranties
- K. Wiring diagrams
- L. Shop drawings and product data

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept air compressors, refrigerated air dryer on site in factory fabricated containers with shipping skids and plastic pipe end protectors in place. Inspect for damage.
- B. Protect piping and equipment from weather and construction traffic.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide three year manufacturer warranty for reciprocating air compressors.

PART 2 PRODUCTS

2.01 PIPE AND PIPE FITTINGS

- A. Steel Pipe: ASTM A53/A53M, Schedule 40 black.
 - 1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
 - 2. Joints: Threaded or welded to ASME B31.1.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), drawn.
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B32, solder, Grade Sn95.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions.
- B. Identify piping system and components. Refer to Section 22 0553.

3.02 FIELD QUALITY CONTROL

- A. Compressed Air Piping Leak Test: Prior to initial operation, clean and test compressed air piping in accordance with ASME B31.1.
- B. Repair or replace compressed air piping as required to eliminate leaks, and retest to demonstrate compliance.
- C. Cap and seal ends of piping when not connected to mechanical equipment.

END OF SECTION

SECTION 22 1500 - GENERAL-SERVICE COMPRESSED-AIR SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe and Pipe Fittings.

1.02 RELATED REQUIREMENTS

- A. Section 22 0548 - Vibration and Seismic Controls for Plumbing Piping and Equipment.
- B. Section 22 0553 - Identification for Plumbing Piping and Equipment: Identification of piping system.

1.03 REFERENCE STANDARDS

- A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.
- B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.
- C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.
- D. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2013.
- E. ASME B31.1 - Power Piping; 2014.
- F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- G. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2017.
- H. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- I. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2016.
- J. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2016.
- K. NEMA MG 1 - Motors and Generators; 2017.
- L. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

- A. Product Data: Provide manufacturers catalog literature with capacity, weight, and electrical characteristics and connection requirements.
- B. Shop Drawings: Indicate piping system schematic with electrical characteristics and connection requirements.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- D. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
- E. Safety instructions
- F. Recommended spare parts
- G. Spare parts lists
- H. Operating instructions
- I. Maintenance instructions, including preventative and corrective maintenance.
- J. Copies of warranties
- K. Wiring diagrams
- L. Shop drawings and product data

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept air compressors, refrigerated air dryer on site in factory fabricated containers with shipping skids and plastic pipe end protectors in place. Inspect for damage.
- B. Protect piping and equipment from weather and construction traffic.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide three year manufacturer warranty for reciprocating air compressors.

PART 2 PRODUCTS

2.01 PIPE AND PIPE FITTINGS

- A. Steel Pipe: ASTM A53/A53M, Schedule 40 black.
 - 1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
 - 2. Joints: Threaded or welded to ASME B31.1.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), drawn.
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B32, solder, Grade Sn95.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions.
- B. Identify piping system and components. Refer to Section 22 0553.

3.02 FIELD QUALITY CONTROL

- A. Compressed Air Piping Leak Test: Prior to initial operation, clean and test compressed air piping in accordance with ASME B31.1.
- B. Repair or replace compressed air piping as required to eliminate leaks, and retest to demonstrate compliance.
- C. Cap and seal ends of piping when not connected to mechanical equipment.

END OF SECTION

SECTION 22 6006 - LABORATORY VACUUM SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Laboratory vacuum system.

1.02 RELATED REQUIREMENTS

- A. Section 22 0548 - Vibration and Seismic Controls for Plumbing Piping and Equipment.
- B. Section 22 0553 - Identification for Plumbing Piping and Equipment.
- C. Section 22 0719 - Plumbing Piping Insulation.

1.03 REFERENCE STANDARDS

- A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.
- B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.
- C. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- D. ASTM B819 - Standard Specification for Seamless Copper Tube for Medical Gas Systems; 2000 (Reapproved 2011).
- E. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011 (Amended 2012).

1.04 SUBMITTALS

- A. Product Data: Provide manufacturers literature and illustrations for all components indicating size, dimensions and configuration.
- B. Shop Drawings: Indicate general assembly of components, mounting and installation details, and general layout of control and alarm panels. Submit detailed medical wall assembly drawings.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with at least three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept material on site in factory containers and packing. Inspect for damage.
- B. Protect from damage and contamination by maintaining factory packaging and caps in place until installation.

PART 2 PRODUCTS

2.01 PIPE AND FITTINGS

- A. Vacuum Evacuation Systems, Aboveground:
 - 1. Copper Tube: ASTM B819, Type K, H58 (drawn, general purpose) temper.
 - 2. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper.
 - 3. Joints: AWS A5.8M/A5.8 Classification BCuP-3 or BCuP-4 silver braze or AWS A5.8M/A5.8, solder, Grade Sn95.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Braze joints in pipe and tubing. Avoid leaving excess flux inside of pipe and fittings. During brazing of pipe connections, purge interior of pipe continuously with nitrogen.
- B. Effect changes in size with reducing fittings. Make changes in direction of required turns or offsets with fittings or tubing shaped by bending tools. Make bends free of flattening, buckling or thinning of tube wall.
- C. Cut pipe and tubing accurately and install without springing or forcing.

- D. Grade piping down in direction of flow.

3.02 PIPING SYSTEMS CLEANING AND PRESSURE TESTING

- A. After erection of pipe and tubing but prior to installation of service outlet valves, blow systems clear of free moisture and foreign matter with nitrogen gas.
- B. Install service outlet valves, subject system to test pressure of 150 psi with nitrogen or dry compressed air. Check with soapy water. Provide 24-hour standing pressure test.

END OF SECTION

SECTION 23 0100 - GENERAL MECHANICAL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Work under Division 23 shall include furnishing of all labor, accessories, tools, equipment and material required to completely execute installation of the entire heating, ventilating and air conditioning systems, plumbing systems and fire protection systems as shown on the drawings and as specified. Work shall include but not be limited to the furnishing, unloading, handling distribution, setting, supporting and installation of all components required for the mechanical systems.
- B. Drawings shall not be scaled. Refer to architectural and structural drawings for building construction and dimensions and to room finish schedule on architectural drawings for material, finish and construction method of walls, floor and ceiling in order to insure proper rough-in and installation of work.

1.02 REFERENCES

- A. FM P7825 - Approval Guide; Factory Mutual.
- B. NEMA MG 1 - Motors and Generators.
- C. NFPA 70 - National Electrical Code.
- D. SSPC-Paint 15 - Steel Joist Shop Paint; Steel Structures Painting Council.
- E. ASME American Society of Mechanical Engineers
- F. ASTM American Society for Testing Materials
- G. NEMA National Electrical Manufacturers Association
- H. NFPA National Fire Protection Association
- I. OSHA Occupational Safety and Health Act
- J. SMACNA Sheet Metal and Air Conditioning Contractors National Association, Inc.
- K. IBC International Building Code
- L. IMC International Mechanical Code
- M. IPC International Plumbing Code
- N. IFC International Fire Code

1.03 INTERPRETATION OF CONTRACT DOCUMENTS:

- A. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.
- B. It shall be understood that the specifications and drawings are complimentary and are to be taken together for a complete interpretation of the work.
- C. No exclusions from, or limitations in, the language used in the drawings or specifications shall be interpreted as meaning that the appurtenances or accessories necessary to complete any required system or item of equipment are to be omitted
- D. The drawings of necessity utilize symbols and schematic diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed in accordance with the diagrammatic intent expressed on the drawings, and in conformity with the dimensions indicated on final architectural and structural working drawings and on equipment shop drawings.
- E. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.

- F. Certain details appear on the drawings which are specific with regard to the dimensioning and positioning of the work. These details are intended only for the purpose of establishing general feasibility. They do not obviate field coordination for the intended work.
- G. Information as to the general construction shall be derived from structural and architectural drawings and specifications only.
- H. The use of words in the singular shall not be considered as limiting where other indications denote that more than one item is referred to.

1.04 PERFORMANCE REQUIREMENTS

- A. Work shall be installed to conform with any City or State law, regulation, code, ordinance, ruling or Fire Underwriters requirement applicable to this class of work.
- B. All installations for construction purposes shall conform with the Department of Labor "Safety and Health Regulations for Construction".
- C. All equipment with electrical components shall bear the UL label.

1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements for submittal procedures.
- B. Documents will not be accepted for approval unless:
 - 1. They are listed in the specifications as an approved manufacturer or approval has been obtained prior to bid.
 - 2. They comply with the requirements of the supplement to the General Conditions.
 - 3. They include complete information pertaining to appurtenances and accessories.
 - 4. They are submitted as a package where they pertain to related items.
 - 5. They are properly marked with service or function identification as related to the project where they consist of catalog sheets displaying other items which are not applicable, and are marked with pertinent specification paragraph number.
 - 6. They are properly marked with external connection identification as related to the project where they consist of standard factory assembly or field installation drawings.

1.06 WARRANTY

- A. See Section 01740 - Warranties and Bonds, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

1.07 COORDINATION OF FABRICATION DRAWING:

- A. The sprinkler piping will generally be run at the lowest elevation possible in the ceiling. Pipes will be run dead level, without pockets, so the piping system is drainable.
- B. Storm drain piping and sanitary waste piping, in which the grade must be maintained, shall have first priority. Ducts and pipes shall be offset to avoid them.
- C. Service piping shall generally be run below ductwork so that they will be accessible for service and modification. The pipes will be offset as required to avoid interfering with access panels, dampers, etc.
- D. Ducts will have second priority. Pipes will be offset as required to avoid them.
- E. Where pipes of different trades conflict, such as domestic water vs. chilled water, the smaller pipe shall be offset.

PART 2 PRODUCTS

2.01 MATERIALS AND MANUFACTURERS:

- A. Equipment and materials installed under this contract shall be new and without blemish or defect.
- B. Each major component of equipment shall have the manufacturer's name, address, model number and rating on a plate securely affixed in a conspicuous place. The nameplate of a

distributing agent will not be acceptable. ASME Code Ratings, UL label, or other data which is die-stamped into the surface of the equipment shall be stamped in a location easily visible.

- C. In all cases the contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed.

2.02 SPECIFIED MATERIALS:

- A. Throughout the drawings and specifications, equipment and systems have been selected and are referenced by name, manufacturer, model number, etc. These references are not intended to limit competition. Products by other listed manufacturers will be acceptable.
- B. If a listed manufacturer other than the basis of design is used, it is the contractor's responsibility for changes in dimension, structural, electrical changes, etc. required for proper installation, function and final performance.

2.03 SUBSTITUTION OF SPECIFIED MATERIALS:

- A. Throughout the drawings and specifications, equipment and systems have been selected and are referenced by name, manufacturer, model number, etc. These references are not intended to limit competition and in most cases materials and methods of construction equal to that specified will be accepted provided prior approval of any substitute item is obtained from the Architect/Engineer. Only products by the listed manufacturers will be acceptable. Contractors and other manufacturers may submit requests to be listed as an acceptable manufacturer on the specified item by submitting documentation in accordance with the requirements of Section 1600. All bidders will be notified by addendum of any approved substitutions. Under no circumstances will any substitutes be accepted after that date; and any item installed on the job which has not been approved in accordance with the noted procedure shall be removed and replaced with the appropriate approved item at the contractor's expense.
- B. In all cases the contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed.

PART 3 EXECUTION

3.01 PROTECTION OF EQUIPMENT:

- A. Protect all materials and equipment from damage during storage at the site and throughout the construction period.
- B. Protection from damage from rain, dirt, sun and ground water shall be accomplished by storing the equipment on elevated supports and covering them on all sides with protective rigid or flexible water proof coverings securely fastened.
- C. Piping shall be protected by storing it on elevated supports and capping the ends with suitable material to prevent dirt accumulation in the piping.

3.02 COORDINATION OF WORK

- A. All work shall be coordinated to avoid conflict with other contractors.
- B. The contractor shall be responsible for checking to insure that the equipment to be installed will fit in the space shown on the drawings. If there is a conflict, the contractor shall notify the Engineer before bid. By submitting a bid the contractor assures that the equipment to be installed will fit or that provisions have been included in the bid to move the equipment to a location where it can be installed without conflict.
- C. The Contractor shall review and coordinate the casework and millwork shop drawings to determine the location of sinks, range hoods, refrigerators, lab equipment, etc., and rough-in and install any and all items shown on the plans.

3.03 CONTIGUOUS WORK:

- A. If any part of the Contractor's work is dependent for its proper execution or for its subsequent efficiency or appearance on the character or conditions of contiguous work not executed by him, this contractor shall examine and measure such contiguous work and report to the Architect in writing any imperfection therein, or conditions that render it unsuitable for the reception of this work. Should the contractor proceed without making such written report, he shall be held to have accepted such work and the existing conditions and he shall be responsible.

3.04 CERTIFICATES OF INSPECTION AND APPROVAL:

- A. Upon completion of work, furnish to the Owner certificates of inspection or approval from the authorities having jurisdiction if certificates of inspection or approval are required by law or regulation.

3.05 SLEEVES AND OPENINGS:

- A. Furnish, locate, install, and fireproof all sleeves and openings required for installation of the work.

3.06 ACCESS TO EQUIPMENT AND VALVES:

- A. All control devices, specialties, valves and removable panels on equipment shall be so located as to provide easy access for inspection and maintenance, including removal of any interior components.
- B. Should any work, such as piping, ducts, conduit, etc. be installed without due regard to the accessibility of devices installed by other contractors, the installation shall be relocated, offset or rerouted without cost to the Owner.

3.07 CUTTING AND PATCHING:

- A. Perform all cutting and patching required for installation of the work.

3.08 WELDING:

- A. Welders shall be qualified as prescribed by Section IX of the ASME Boiler Code. All weld joints shall conform to ANSI/ASME B-31.1.

3.09 PROJECT CLOSEOUT:

- A. Maintenance Manuals: At the end of construction, furnish to the Architect three (3) bound and indexed sets of maintenance and operating instructions, parts lists, electrical wiring diagrams, balance data, and manufacturer's literature sufficient for operation and complete maintenance of all equipment by the Owner.
- B. Approved submittals and shop drawings may be included in the Maintenance Manuals instead of being separately furnished, if desired.
- C. It is intended that the documentation provided in maintenance manuals, along with as-built drawings, shall be complete and detailed enough to permit and facilitate troubleshooting, engineering analysis, and design work for future changes, without extensive field investigations and testing. Manuals shall be prepared so as to explain system operation and equipment to those not acquainted with the job.
- D. Manuals shall be durably bound and clearly identified on the front cover (and on the spine of thick volumes). Identification shall include the building or project name, applicable trade (such as HVAC, Plumbing, Fire Protection, etc.), approximate date of completion (month and year) and contractor's name.
- E. Manuals shall be organized into well defined and easy to locate sections, with index tabs or separators to divide the sections. A complete table of contents shall be provided at the front indicating the section or page number for each system, subsystem, or supplier/manufacturer.
- F. Manuals shall include complete information and diagrams on all controls, indicators, sensors, and signal sources. Control diagrams are to show the locations of components and major equipment by room number or other identification when room numbers are not applicable.

Locations of out-of-sight components, such as duct mounted sensors, flow switches, etc. should be clearly indicated. Control diagrams must include identification of components by make and model number, operating ranges, recommended set points, reset schedules, and other job-specific data useful for troubleshooting, calibration and maintenance. Complete narrative descriptions of operating sequences of control systems and subsystems shall be included on the prints adjacent to the corresponding schematics. Catalog data and cuts shall be clearly marked to indicate model numbers, sizes, capacities, operating points, and other characteristics of each item used. This should include accessories or special features provided. Where various sizes or variations of a series or model are used, documents should clearly show which are used where. Where quantities are appropriate, schedule of usage should be provided. Maintenance literature shall include complete information for identifying and ordering replacement parts, such as illustrated parts breakdowns.

- G. Maintenance manuals must include complete balance data on all systems.

3.10 INSTRUCTIONS TO OWNER:

- A. Contractor shall conduct a maintenance and operational instruction session for the Owner. Where highly technical or complex equipment is supplied, such as chillers and control systems, manufacturer's representatives, controls subcontractors, and other appropriate personnel who are particularly qualified, shall conduct training sessions pertaining to their equipment, or systems. Such training shall be scheduled with the Owner in advance.

3.11 SPARE FILTERS:

- A. Spare filters shall be delivered to Owner's representative.

3.12 WARRANTIES:

- A. This Contractor warrants the mechanical systems to be free of defects in materials and workmanship for a period of one year after date of final payment. The effective dates of this warranty apply to all components of the mechanical systems regardless of any equipment manufacturer's warranties which may expire at an earlier date. Any system malfunctions, or any previously undiscovered non-compliance with the plans and specifications, during the warranty period shall be repaired at no cost to the Owner.
- B. Deliver to Owner all warranties, guarantees, etc. and obtain written receipts.

END OF SECTION

SECTION 23 0529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment components for equipment, piping, and other HVAC/hydraulic work.

1.02 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2013.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
 - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 - 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
 - 4. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
 - 1. Comply with MFMA-4.
- C. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
 - 1. Minimum Size, Unless Otherwise Indicated or Required:

- a. Equipment Supports: 1/2 inch diameter.
 - b. Piping up to 1 inch (27 mm) nominal: 1/4 inch diameter.
 - c. Piping larger than 1 inch (27 mm) nominal: 3/8 inch diameter.
 - d. Trapeze Support for Multiple Pipes: 3/8 inch diameter.
- D. Non-Penetrating Rooftop Supports for Low-Slope Roofs:
1. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Erico International Corporation, a brand of Pentair: www.erico.com/#sle.
 - c. PHP Systems/Design: www.phpsd.com/#sle.
 - d. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
 2. Provide steel pedestals with thermoplastic or rubber base that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified.
 3. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 4. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
 5. Mounting Height: Provide minimum clearance of 6 inches under supported component to top of roofing.
- E. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
 2. Steel: Use beam clamps, machine bolts, or welded threaded studs.
 3. Sheet Metal: Use sheet metal screws.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.
- C. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- D. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- F. Equipment Support and Attachment:
 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- G. Secure fasteners according to manufacturer's recommended torque settings.

H. Remove temporary supports.

END OF SECTION

SECTION 23 0548 - VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Equipment support bases.
- B. Vibration isolators.
- C. Seismic snubber assemblies.
- D. Seismic restraints for suspended components and equipment.
- E. Roof curbs.

1.02 RELATED REQUIREMENTS

- A. Section 01 4533 - Code-Required Special Inspections.

1.03 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; Most Recent Edition Cited by Referring Code or Reference Standard.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Provide schedule of vibration isolator type with location and load on each.
 - 2. Fully dimensioned fabrication drawings and installation details for vibration isolation bases, member sizes, attachments to isolators, and supported equipment.
 - 3. Include auxiliary motor slide bases and rails, base weights, inertia bases, concrete weights, equipment static loads, support points, vibration isolators, and detailed layout of isolator location and orientation with static and dynamic load on each isolator.
 - 4. Include selections from prescriptive design tables that indicate compliance with the applicable building code and the vibration isolator manufacturer's requirements.
 - 5. Include the calculations that indicate compliance with the applicable building code for seismic controls and the vibration isolator manufacturer's requirements.
 - 6. Include the seal of the Professional Structural Engineer registered in the State of South Carolina in which the Project is located, on drawings and calculations which at a minimum include the following:
 - a. Seismic Restraint Details: Detailed drawings of seismic restraints and snubbers including anchorage details that indicate quantity, diameter, and depth of penetration, edge distance, and spacing of anchors.
 - b. Equipment Seismic Qualification Certification: Certification by the manufacturer or responsible party that each piece of equipment provided will withstand seismic force levels as specified in the applicable building code for seismic controls.
 - 1) Basis for Certification: Indicate whether the withstand certification is based on actual testing of assembled components, on calculations, or on historic data.
 - 2) Indicate equipment to be sufficiently durable to resist design forces and or remain functional after the seismic event.
 - c. Statement of Special Inspections: Prepared by the registered design professional in responsible charge.

1.05 QUALITY ASSURANCE

- A. Perform design and installation in accordance with applicable codes.
- B. Designer Qualifications: Perform design of seismic controls under direct supervision of a Professional Engineer experienced in design of this type of work and registered and licensed in the State in which the Project is located.

- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Kinetics Noise Control, Inc: www.kineticsnoise.com/#sle.
- B. Mason Industries: www.mason-ind.com/#sle.
- C. Vibration Eliminator Company, Inc: www.veco-nyc.com/#sle.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. General:
 - 1. All vibration isolators, base frames and inertia bases to conform to all uniform deflection and stability requirements under all operating loads.
 - 2. Steel springs to function without undue stress or overloading.

2.03 VIBRATION ISOLATORS

- A. Non-Seismic Type:
 - 1. All Elastomeric-Fiber Glass Pads:
 - a. Configuration: Flat or molded.
 - b. Thickness: 0.25 inch minimum.
 - c. Assembly: Single or multiple layers using bonded, galvanized sheet metal separation plate between each layer with load plate providing evenly distributed load over pad surface.
 - 2. Restrained Steel Springs:
 - a. Housing: Rigid blocking during rigging prevents equipment installed and operating height from changing during temporary weight reduction.
 - b. Equipment Wind Loading: Adequate means for fastening isolator top to equipment and isolator base plate to supporting structure.
 - 3. Spring Hanger:
 - a. Housing: Steel construction containing stable steel spring and integral elastomeric element preventing metal to metal contact.
 - b. Bottom Opening: Sized to allow plus/minus 15 degrees rod misalignment.
 - 4. Thrust Restraints:
 - a. Housing: Steel construction containing stable steel spring and integral elastomeric element installed in pairs to resist air pressure thrusts.
 - b. Bottom Openings: Sized to allow plus/minus 15 degrees rod misalignment.
- B. Seismic Type:
 - 1. Coil Springs Consisting of Single Elements:
 - a. Housing: Manufactured from cast iron material.
 - b. Ductile Material: Designed and rated for seismic applications.
 - c. Spring: Restrained by housing without significant degradation of vibration isolation capabilities during normal equipment operating conditions.
 - d. Resilient Snubbing Grommet System: Incorporated and designed with clearances of no more than 0.25 inch in any direction preventing direct metal-to-metal contact between supported member and fixed restraint housing.
 - e. Resilient Pad: Located in series with spring.
 - f. Coil Springs: Color coded elements to have a lateral stiffness greater than 0.8 times the rated vertical stiffness with 50 percent overload capacity.
 - g. Finish: Suitable for the application.
 - 2. All Directional Elastomeric:
 - a. Material: Molded from oil, ozone, and oxidant resistant compounds.

- b. Operating Parameters: Designed to operate within the isolator strain limits providing maximum performance and service life.
- c. Attachment Method: Encapsulated load transfer plate bolted to equipment and base plate with anchor hole bolted to supporting structure.
- d. Rating: Cast iron and aluminum housings rated for seismic restraint applications.
- e. Minimum Operating Static Deflections: Deflections indicated in project documents are not to exceed published load capacities.

2.04 SEISMIC SNUBBER ASSEMBLIES

- A. Comply with:
 - 1. ASHRAE (HVACA) Handbook - HVAC Applications.
- B. All Directional External:
 - 1. Application: Minimum three (3) snubbers are required for each equipment installation, oriented properly to restrain isolated equipment in all directions.
 - 2. Construction: Interlocking steel construction attached to the building structure and equipment in a manner consistent with anticipated design loads.
 - 3. Performance: Equipment movement at each snubber location limited to a maximum of 0.25 inches in any direction without significantly degrading the vibration isolation capability of the isolator during normal operating conditions.
 - 4. Resilient Pad: Minimum 0.25 inch thick cushions any impact and prevents metal-to-metal contact.

2.05 SEISMIC RESTRAINTS FOR SUSPENDED COMPONENTS AND EQUIPMENT

- A. Cable Restraints:
 - 1. Wire Rope: Steel wire strand cables sized to resist seismic loads in all lateral directions.
 - 2. Protective Thimbles: Eliminates potential for dynamic cable wear and strand breakage.
 - 3. Size: Based on the lesser of cable capacity or anchor load taking into account bracket geometry.
 - 4. Connections:
 - a. Use overlapping wire rope U clips, cable clamping bolts, swaged sleeves or seismically rated tool-less wedge insert lock connectors.
 - b. Internally brace clevis hanger bracket cross bolt to prevent deformation.
 - 5. Vertical Suspension Rods: Attach required bracing of sufficient strength to prevent rod buckling from vertical compression forces utilizing series of attachment clips.
- B. Rigid Restraints:
 - 1. Structural Element: Sized to resist seismic loads in all lateral directions and carry both compressive and tensile loading.
 - 2. Size: Based on the lesser of cable capacity or anchor load taking into account bracket geometry.
 - 3. Connections: Internally brace clevis hanger bracket cross bolt to prevent deformation.
 - 4. Static Support System: Anchorage capable of carrying additional tension loads generated by the vertical component of the rigid brace compression which is additive to any static load requirements on the system.
 - 5. Vertical Suspension Rods: Attached required bracing of sufficient strength to prevent rod buckling from vertical compression forces utilizing series of attachment clips.

2.06 ROOF CURBS

- A. Seismic Type Non-Isolated Curb and Fabricated Equipment Piers:
 - 1. Location: Between structure and rooftop equipment.
 - 2. Construction: Steel.
 - 3. Weather exposed components consist of corrosion resistant materials.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Install in accordance with manufacturer's instructions.
- B. On closed spring isolators, adjust so side stabilizers are clear under normal operating conditions.
- C. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height. When full load is applied, adjust isolators to load to allow shim removal.
- D. Support piping connections to equipment mounted on isolators using isolators or resilient hangers for scheduled distance.
 - 1. Up to 4 Inches Pipe Size: First three points of support.

3.02 INSTALLATION - SEISMIC

- A. Seismic Snubbers:
 - 1. Provide on all isolated equipment, piping and ductwork.
 - 2. Provide minimum of four seismic snubbers located close to isolators.
 - 3. Snub equipment designated for post-disaster use to 0.05 inch maximum clearance.
 - 4. Snub all other equipment between 0.15 inch and 0.25 inch clearance.
- B. Suspended Mechanical Equipment:
 - 1. Provide supports and bracing to resist seismic design force in any direction.
 - 2. Provide flexible connections between equipment and interconnected piping.
 - 3. Brace equipment hung from spring mounts using cable or other bracing that will not transmit vibration to the structure.
- C. Piping:
 - 1. Provide seismic bracing in accordance ASCE 7.
 - 2. Provide supports, braces, and anchors to resist gravity and seismic design forces.
 - 3. Provide flexible connections between floor mounted equipment and suspended piping; between unbraced piping and restrained suspended items; as required for thermal movement; at building separations and seismic joints; and wherever relative differential movements could damage pipe in an earthquake.
 - 4. Brace resiliently supported pipe with cable bracing or alternate means designed to prevent transmission of vibrations and noise to the structure.
- D. Ductwork:
 - 1. Provide seismic bracing for ducts with cross sectional area greater than 6 sq ft (independent of duct contents).
 - 2. Provide seismic bracing for all ducts containing hazardous materials.
 - 3. Provide supports, braces, and anchors to resist gravity and seismic design forces.
 - 4. Install ducts and duct risers designed to accommodate interstory drift.
 - 5. Independently support in-line devices weighing more than 20 pounds.
 - 6. Independently support and brace all in-line devices weighing more than 75 pounds.
 - 7. Install duct supports designed to resist not less than 150 percent of the duct weight.

END OF SECTION

SECTION 23 0553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Stencils.
- D. Pipe markers.
- E. Ceiling tacks.

1.02 RELATED REQUIREMENTS

- A. Section 09 9123 - Interior Painting: Identification painting.

1.03 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2007.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

- A. Air Handling Units: Nameplates.
- B. Automatic Controls: Tags. Key to control schematic.
- C. Ductwork: Stencilled painting.
- D. Piping: Pipe markers.
- E. Thermostats: Nameplates.
- F. Valves: Tags and ceiling tacks where located above lay-in ceiling.

2.02 NAMEPLATES

- A. Letter Color: White.
- B. Letter Height: 1/4 inch.
- C. Background Color: Black.
- D. Plastic: Conform to ASTM D709.

2.03 TAGS

- A. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
- B. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

2.04 STENCILS

- A. Stencils: With clean cut symbols and letters of following size:
 - 1. Ductwork and Equipment: 2-1/2 inch high letters.
- B. Stencil Paint: As specified in Section 09 9123, semi-gloss enamel, colors conforming to ASME A13.1.

2.05 PIPE MARKERS

- A. Color: Conform to ASME A13.1.

- B. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

2.06 CEILING TACKS

- A. Description: Steel with 3/4 inch diameter color coded head.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- D. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

SECTION 23 0593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of hydronic systems.
- C. Field quality-control testing of Laboratory fume hoods.

1.02 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.
- B. ASHRAE Std 110 - Methods of Testing Performance of Laboratory Fume Hoods; 2016.
- C. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008.
- D. NEBB (TAB) - Procedural Standards for Testing Adjusting and Balancing of Environmental Systems; 2015, with Errata (2017).
- E. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2002.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
 - 1. Include at least the following in the plan:
 - a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
 - b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - c. Identification and types of measurement instruments to be used and their most recent calibration date.
 - d. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
 - e. Final test report forms to be used.
 - f. Detailed step-by-step procedures for TAB work for each system and issue, including:
 - 1) Terminal flow calibration (for each terminal type).
 - 2) Diffuser proportioning.
 - 3) Branch/submain proportioning.
 - 4) Total flow calculations.
 - 5) Rechecking.
 - 6) Diversity issues.
 - g. Expected problems and solutions, etc.
 - h. Method of verifying and setting minimum outside air flow rate will be verified and set and for what level (total building, zone, etc.).
 - i. Method of checking building static and exhaust fan and/or relief damper capacity.
 - j. Exhaust fan balancing and capacity verifications, including any required room pressure differentials.
 - k. Procedures for formal deficiency reports, including scope, frequency and distribution.
- C. Field Quality-control Testing of Laboratory Fume Hoods:
 - 1. Product Data sheets for all equipment proposed for use in on-site as-installed testing.
 - 2. Sample Test Report.
 - 3. List of laboratory fume hoods to be tested. Submit a minimum of one week prior to commencement of testing.

4. Test data demonstrating that each type of fume hood provided for the project has been successfully tested in the factory as per requirements of Section 11 5313.
- D. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
 3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
 1. AABC (NSTSB), AABC National Standards for Total System Balance.
 2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
 3. SMACNA (TAB).
 4. Maintain at least one copy of the standard to be used at project site at all times.
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:
 1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
 2. Having minimum of three years documented experience.
 3. Certified by one of the following:
 - a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.
 - b. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org/#sle.
- E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 1. Systems are started and operating in a safe and normal condition.
 2. Temperature control systems are installed complete and operable.
 3. Proper thermal overload protection is in place for electrical equipment.
 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 5. Duct systems are clean of debris.
 6. Fans are rotating correctly.
 7. Access doors are closed and duct end caps are in place.
 8. Air outlets are installed and connected.
 9. Duct system leakage is minimized.
 10. Hydronic systems are flushed, filled, and vented.

11. Service and balance valves are open.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
- C. Beginning of work means acceptance of existing conditions.

3.03 PREPARATION

- A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.
- B. Provide additional balancing devices as required.

3.04 ADJUSTMENT TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.
- C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.05 RECORDING AND ADJUSTING

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.06 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.

3.07 WATER SYSTEM PROCEDURE

- A. Adjust water systems to provide required or design quantities.
- B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gages to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.
- C. Effect system balance with automatic control valves fully open to heat transfer elements.
- D. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.

3.08 SCOPE

- A. Test, adjust, and balance the following:
 1. Air Handling Units.
 2. Fans.
 3. Air Inlets and Outlets.
 4. Fume Extractor Hood

3.09 MINIMUM DATA TO BE REPORTED

- A. Electric Motors:
 1. Manufacturer.
 2. Model/Frame.
 3. HP/BHP.
 4. Phase, voltage, amperage; nameplate, actual, no load.
 5. RPM.
 6. Service factor.
 7. Starter size, rating, heater elements.
 8. Sheave Make/Size/Bore.
- B. Cooling Coils:
 1. Identification/number.
 2. Location.
 3. Service.
 4. Manufacturer.
 5. Air flow, design and actual.
 6. Entering air DB temperature, design and actual.
 7. Entering air WB temperature, design and actual.
 8. Leaving air DB temperature, design and actual.
 9. Leaving air WB temperature, design and actual.
 10. Water flow, design and actual.
 11. Water pressure drop, design and actual.
 12. Entering water temperature, design and actual.
 13. Leaving water temperature, design and actual.
 14. Saturated suction temperature, design and actual.
 15. Air pressure drop, design and actual.
- C. Heating Coils:
 1. Identification/number.
 2. Location.
 3. Service.
 4. Manufacturer.
 5. Air flow, design and actual.
 6. Water flow, design and actual.
 7. Water pressure drop, design and actual.
 8. Entering water temperature, design and actual.
 9. Leaving water temperature, design and actual.

10. Entering air temperature, design and actual.
 11. Leaving air temperature, design and actual.
 12. Air pressure drop, design and actual.
- D. Return Air/Outside Air:
1. Identification/location.
 2. Design air flow.
 3. Actual air flow.
 4. Design return air flow.
 5. Actual return air flow.
 6. Design outside air flow.
 7. Actual outside air flow.
 8. Return air temperature.
 9. Outside air temperature.
 10. Required mixed air temperature.
 11. Actual mixed air temperature.
 12. Design outside/return air ratio.
 13. Actual outside/return air ratio.
- E. Exhaust Fans:
1. Location.
 2. Manufacturer.
 3. Model number.
 4. Serial number.
 5. Air flow, specified and actual.
 6. Total static pressure (total external), specified and actual.
 7. Inlet pressure.
 8. Discharge pressure.
 9. Sheave Make/Size/Bore.
 10. Number of Belts/Make/Size.
 11. Fan RPM.
- F. Air Distribution Tests:
1. Air terminal number.
 2. Room number/location.
 3. Terminal type.
 4. Terminal size.
 5. Area factor.
 6. Design velocity.
 7. Design air flow.
 8. Test (final) velocity.
 9. Test (final) air flow.
 10. Percent of design air flow.

END OF SECTION

SECTION 23 0713 - DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Duct insulation.
- B. Insulation jackets.

1.02 RELATED REQUIREMENTS

- A. Section 23 0553 - Identification for HVAC Piping and Equipment.

1.03 REFERENCE STANDARDS

- A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- B. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- C. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2017.
- D. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.
- E. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- H. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).
- I. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.06 FIELD CONDITIONS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER, FLEXIBLE

- A. Manufacturer:
 - 1. Johns Manville: www.jm.com/#sle.
 - 2. Knauf Insulation; Atmosphere Duct Wrap: www.knaufinsulation.com/#sle.
 - 3. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
 - 4. CertainTeed Corporation: www.certainteed.com/#sle.

5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: ASTM C553; flexible, noncombustible blanket.
 1. 'K' value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.
 2. Maximum Service Temperature: 1200 degrees F.
 3. Maximum Water Vapor Absorption: 5.0 percent by weight.
- C. Vapor Barrier Jacket:
 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
 3. Secure with pressure sensitive tape.
- D. Vapor Barrier Tape:
 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
- E. Outdoor Vapor Barrier Mastic:
 1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
- F. Tie Wire: Annealed steel, 16 gage, 0.0508 inch diameter.

2.03 GLASS FIBER, RIGID

- A. Manufacturer:
 1. Johns Manville: www.jm.com/#sle.
 2. Knauf Insulation: www.knaufinsulation.com/#sle.
 3. Owens Corning Corporation; 700 Series FIBERGLAS Insulation: www.ocbuildingspec.com/#sle.
 4. CertainTeed Corporation: www.certainteed.com/#sle.
 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: ASTM C612; rigid, noncombustible blanket.
 1. 'K' Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.
 2. Maximum Service Temperature: 450 degrees F.
 3. Maximum Water Vapor Absorption: 5.0 percent.
 4. Maximum Density: 8.0 lb/cu ft.
- C. Vapor Barrier Jacket:
 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
 3. Secure with pressure sensitive tape.
- D. Vapor Barrier Tape:
 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
- E. Indoor Vapor Barrier Finish:
 1. Cloth: Untreated; 9 oz/sq yd weight, glass fabric.
 2. Vinyl emulsion type acrylic, compatible with insulation, black color.

2.04 JACKETS

- A. Aluminum Jacket: ASTM B209 (ASTM B209M).
 1. Thickness: 0.016 inch sheet.
 2. Finish: Embossed.
 3. Joining: Longitudinal slip joints and 2 inch laps.
 4. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.
 5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.
 6. Metal Jacket Bands: 3/8 inch wide; 0.010 inch thick stainless steel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that ducts have been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Insulated ducts conveying air below ambient temperature:
 - 1. Provide insulation with vapor barrier jackets.
 - 2. Finish with tape and vapor barrier jacket.
 - 3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
 - 4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- C. Insulated ducts conveying air above ambient temperature:
 - 1. Provide with or without standard vapor barrier jacket.
 - 2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- D. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with with calked aluminum jacket with seams located on bottom side of horizontal duct section.
- E. External Duct Insulation Application:
 - 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
 - 2. Secure insulation without vapor barrier with staples, tape, or wires.
 - 3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
 - 4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
 - 5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

3.03 SCHEDULES

- A. Exhaust Ducts Exposed to Outdoor Air: 2" Rigid glass fiber
- B. Exhaust Ducts within 10' of passing through an exterior wall: 2" Rigid glass fiber
- C. Supply Ducts: 2" flexible glass fiber

END OF SECTION

SECTION 23 0719 - HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping insulation.
- B. Flexible removable and reusable blanket insulation.

1.02 RELATED REQUIREMENTS

- A. Section 23 2113 - Hydronic Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.
- B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.
- C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2017.
- D. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2013).
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- F. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER

- A. Manufacturers:
 - 1. CertainTeed Corporation: www.certainteed.com/#sle.
 - 2. Johns Manville Corporation: www.jm.com/#sle.
 - 3. Knauf Insulation; Earthwool 1000 Degree Pipe Insulation: www.knaufinsulation.com/#sle.
 - 4. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: www.ocbuildingspec.com/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
 - 1. 'K' Value: ASTM C177, 0.24 at 75 degrees F.
 - 2. Maximum Service Temperature: 850 degrees F.

3. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.
- D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- E. Vapor Barrier Lap Adhesive: Compatible with insulation.
- F. Indoor Vapor Barrier Finish:
 1. Cloth: Untreated; 9 oz/sq yd weight.

2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturer:
 1. Aeroflex USA, Inc: www.aeroflexusa.com/#sle.
 2. Armacell LLC; AP Armaflex: www.armacell.us/#sle.
 3. K-Flex USA LLC; K-Flex Titan: www.kflexusa.com/#sle.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
 1. Minimum Service Temperature: Minus 40 degrees F.
 2. Maximum Service Temperature: 180 degrees F.
 3. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Glass fiber insulated pipes conveying fluids below ambient temperature:
 1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- C. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- D. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- E. Glass fiber insulated pipes conveying fluids above ambient temperature.
 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- F. Inserts and Shields:
 1. Application: Piping 1-1/2 inches diameter or larger.
 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
 3. Insert location: Between support shield and piping and under the finish jacket.
 4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.

5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

3.03 SCHEDULE

- A. Heating Systems:
 1. Heating Water Supply and Return: 2" glass fiber
- B. Cooling Systems:
 1. Chilled Water: 2" glass fiber
 2. Condensate Drains from Cooling Coils: 1" flexible elastomeric

END OF SECTION

SECTION 23 0719 - HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping insulation.
- B. Flexible removable and reusable blanket insulation.

1.02 RELATED REQUIREMENTS

- A. Section 23 2113 - Hydronic Piping: Placement of hangers and hanger inserts.

1.03 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.
- B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.
- C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2017.
- D. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2013).
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- F. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER

- A. Manufacturers:
 - 1. CertainTeed Corporation: www.certainteed.com/#sle.
 - 2. Johns Manville Corporation: www.jm.com/#sle.
 - 3. Knauf Insulation; Earthwool 1000 Degree Pipe Insulation: www.knaufinsulation.com/#sle.
 - 4. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: www.ocbuildingspec.com/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
 - 1. 'K' Value: ASTM C177, 0.24 at 75 degrees F.
 - 2. Maximum Service Temperature: 850 degrees F.

3. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.
- D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- E. Vapor Barrier Lap Adhesive: Compatible with insulation.
- F. Indoor Vapor Barrier Finish:
 1. Cloth: Untreated; 9 oz/sq yd weight.

2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturer:
 1. Aeroflex USA, Inc: www.aeroflexusa.com/#sle.
 2. Armacell LLC; AP Armaflex: www.armacell.us/#sle.
 3. K-Flex USA LLC; K-Flex Titan: www.kflexusa.com/#sle.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
 1. Minimum Service Temperature: Minus 40 degrees F.
 2. Maximum Service Temperature: 180 degrees F.
 3. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Glass fiber insulated pipes conveying fluids below ambient temperature:
 1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- C. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- D. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- E. Glass fiber insulated pipes conveying fluids above ambient temperature.
 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- F. Inserts and Shields:
 1. Application: Piping 1-1/2 inches diameter or larger.
 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
 3. Insert location: Between support shield and piping and under the finish jacket.
 4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.

5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

3.03 SCHEDULE

- A. Heating Systems:
 1. Heating Water Supply and Return: 2" glass fiber
- B. Cooling Systems:
 1. Chilled Water: 2" glass fiber
 2. Condensate Drains from Cooling Coils: 1" flexible elastomeric

END OF SECTION

SECTION 23 0923 - DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. System description.
- B. Controllers.

1.02 RELATED REQUIREMENTS

- A. Section 23 0913 - Instrumentation and Control Devices for HVAC.
- B. Section 23 0993 - Sequence of Operations for HVAC Controls.
- C. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for each system component and software module.

1.04 QUALITY ASSURANCE

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Automated Logic.

2.02 SYSTEM DESCRIPTION

- A. Automatic temperature control field monitoring and control system using field programmable micro-processor based units.
- B. Base system on distributed system of fully intelligent, stand-alone controllers, operating in a multi-tasking, multi-user environment on token passing network, with central and remote hardware, software, and interconnecting wire and conduit.
- C. Include computer software and hardware, operator input/output devices, control units, local area networks (LAN), sensors, control devices, actuators.
- D. Controls for fan coils, and the like when directly connected to the control units. Individual terminal unit control is specified in Section 23 0913.
- E. Provide control systems consisting of thermostats, control valves, dampers and operators, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.
- F. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.
- G. New unit shall be connected to existing building management system.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.
- B. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation. Refer to Section 23 0993.
- C. Provide conduit and electrical wiring in accordance with Section 26 0583. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

3.02 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate complete and operating system to Owner.

END OF SECTION

SECTION 23 0993 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This section defines the manner and method by which controls function. Requirements for each type of control system operation are specified. Equipment, devices, and system components required for control systems are specified in other sections.
- B. Sequence of operation for:
 - 1. Fan coil units.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 FAN COIL UNITS (CONSTANT VOLUME LABORATORY)

- A. Single wall mounted temperature sensor and humidity sensor shall control the new fan-coil unit to maintain 70° f and 50% relative humidity
- B. Fan shall operate constantly when scheduled for occupancy.
- C. Upon call for cooling, modulate cooling coil open until temperature is maintained.
- D. Upon call for heating, modulate heating coil open until temperature is maintained.
- E. Dehumidification mode
 - 1. If humidity sensor rises above 60% rh (setable) modulate cooling coil fully open and modulate heating coil open to maintain 70° (setable) space temperature.

END OF SECTION

SECTION 23 0993 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This section defines the manner and method by which controls function. Requirements for each type of control system operation are specified. Equipment, devices, and system components required for control systems are specified in other sections.
- B. Sequence of operation for:
 - 1. Fan coil units.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 FAN COIL UNITS (CONSTANT VOLUME LABORATORY)

- A. Single wall mounted temperature sensor and humidity sensor shall control the new fan-coil unit to maintain 70° f and 50% relative humidity
- B. Fan shall operate constantly when scheduled for occupancy.
- C. Upon call for cooling, modulate cooling coil open until temperature is maintained.
- D. Upon call for heating, modulate heating coil open until temperature is maintained.
- E. Dehumidification mode
 - 1. If humidity sensor rises above 60% rh (setable) modulate cooling coil fully open and modulate heating coil open to maintain 70° (setable) space temperature.

END OF SECTION

SECTION 23 2500 - HVAC WATER TREATMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Materials.
 - 1. System cleaner.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. AmSolv-Amrep, Inc: www.amsolv.com/#sle.
- B. GE Water & Process Technologies: www.gewater.com/#sle.
- C. Nalco, an Ecolab Company: www.nalco.com/#sle.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. System Cleaner:
 - 1. Manufacturers:
 - 2. Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products; sodiumtripoly phosphate and sodium molybdate.
 - 3. Biocide chlorine release agents such as sodium hypochlorite or calcium hypochlorite or microbiocides such as quarternary ammonia compounds, tributyltin oxide, methylene bis (thiocyanate).

PART 3 EXECUTION

3.01 PREPARATION

- A. Systems shall be operational, filled, started, and vented prior to cleaning. Use water meter to record capacity in each system.
- B. Place terminal control valves in open position during cleaning.
- C. Verify that electric power is available and of the correct characteristics.

3.02 CLEANING SEQUENCE

- A. Concentration:
 - 1. As recommended by manufacturer.
- B. Hot Water Heating Systems:
 - 1. Apply heat while circulating, slowly raising temperature to 160 degrees F and maintain for 12 hours minimum.
 - 2. Remove heat and circulate to 100 degrees F or less; drain systems as quickly as possible and refill with clean water.
 - 3. Circulate for 6 hours at design temperatures, then drain.
 - 4. Refill with clean water and repeat until system cleaner is removed.
- C. Chilled Water Systems:
 - 1. Circulate for 48 hours, then drain systems as quickly as possible.
 - 2. Refill with clean water, circulate for 24 hours, then drain.
 - 3. Refill with clean water and repeat until system cleaner is removed.
- D. Use neutralizer agents on recommendation of system cleaner supplier and approval of Architect.
- E. Remove, clean, and replace strainer screens.
- F. Inspect, remove sludge, and flush low points with clean water after cleaning process is completed. Include disassembly of components as required.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 23 3100 - HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal ductwork.

1.02 RELATED REQUIREMENTS

- A. Section 23 0593 - Testing, Adjusting, and Balancing for HVAC.
- B. Section 23 0713 - Duct Insulation: External insulation and duct liner.
- C. Section 23 3300 - Air Duct Accessories.
- D. Section 23 3700 - Air Outlets and Inlets.

1.03 REFERENCE STANDARDS

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 DUCT ASSEMBLIES

- A. Regulatory Requirements: Construct ductwork to NFPA 90A standards.
- B. Ducts: Galvanized steel, unless otherwise indicated.
- C. Low Pressure Supply (System with Cooling Coils): 1 inch w.g. pressure class, galvanized steel.
- D. Return and Relief: 1 inch w.g. pressure class, galvanized steel.
- E. Fume Hood Exhaust: 1 inch w.g. pressure class, stainless steel.

2.02 MATERIALS

- A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
- B. Stainless Steel for Ducts: ASTM A666, Type 304.
- C. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - 1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
 - 2. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
 - 3. For Use With Flexible Ducts: UL labeled.

2.03 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA (DCS) and as indicated.
- B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

- C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- D. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA (DCS).

2.04 MANUFACTURED DUCTWORK AND FITTINGS

- A. Flexible Ducts: Two ply vinyl film supported by helically wound spring steel wire.
 - 1. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
 - 2. Maximum Velocity: 4000 fpm.
 - 3. Temperature Range: Minus 10 degrees F to 160 degrees F.
- B. Flexible Ducts: Stainless steel, suitable for chemical exhaust stream.
 - 1. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
 - 2. Maximum Velocity: 4000 fpm.
 - 3. Temperature Range: Minus 10 degrees F to 160 degrees F.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install in accordance with manufacturer's instructions.
- C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- D. Flexible Ducts: Connect to metal ducts with adhesive plus sheet metal screws.
- E. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.
- F. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- G. Use double nuts and lock washers on threaded rod supports.
- H. Connect diffusers or light troffer boots to low pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.

END OF SECTION

SECTION 23 3300 - AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Duct test holes.
- C. Flexible duct connections.
- D. Volume control dampers.
- E. Miscellaneous products:
 - 1. Duct opening closure film.

1.02 RELATED REQUIREMENTS

- A. Section 23 3100 - HVAC Ducts and Casings.

1.03 REFERENCE STANDARDS

- A. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2012.
- B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- C. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 AIR TURNING DEVICES/EXTRACTORS

- A. Manufacturers:
 - 1. Krueger-HVAC, Division of Air System Components: www.krueger-hvac.com/#sle.
 - 2. Ruskin Company, a brand of Johnson Controls: www.ruskin.com/#sle.
 - 3. Titus HVAC, a brand of Johnson Controls: www.titus-hvac.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DUCT TEST HOLES

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

2.03 FLEXIBLE DUCT CONNECTIONS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Flexible Duct Connections: Fabric crimped into metal edging strip.
 - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
- C. Leaded Vinyl Sheet: Minimum 0.55 inch thick, 0.87 lbs per sq ft, 10 dB attenuation in 10 to 10,000 Hz range.
- D. Maximum Installed Length: 14 inch.

2.04 VOLUME CONTROL DAMPERS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.

- B. Single Blade Dampers:
 - 1. Fabricate for duct sizes up to 6 by 30 inch.
 - 2. Blade: 24 gage, 0.0239 inch, minimum.
- C. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.
- D. Quadrants:
 - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
 - 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
 - 3. Where rod lengths exceed 30 inches provide regulator at both ends.

2.05 MISCELLANEOUS PRODUCTS

- A. Duct Opening Closure Film: Mold-resistant, self-adhesive film to keep debris out of ducts during construction.
 - 1. Thickness: 2 mils.
 - 2. High tack water based adhesive.
 - 3. UV stable light blue color.
 - 4. Elongation Before Break: 325 percent, minimum.

PART 3 EXECUTION

3.01 PREPARATION

- A. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 23 3100 for duct construction and pressure class.
- B. Provide duct test holes where indicated and required for testing and balancing purposes.
- C. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- D. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
- E. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- F. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

SECTION 23 3423 - HVAC POWER VENTILATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof exhausters.
- B. Utility vent set.

1.02 RELATED REQUIREMENTS

- A. Section 23 3300 - Air Duct Accessories: Backdraft dampers.

1.03 REFERENCE STANDARDS

- A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
- B. AMCA 99 - Standards Handbook; 2016.
- C. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2005.
- D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016.
- E. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.
- F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.
- G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- H. UL 705 - Power Ventilators; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- C. Manufacturer's Instructions: Indicate installation instructions.
- D. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

PART 2 PRODUCTS

2.01 POWER VENTILATORS - GENERAL

- A. Static and Dynamically Balanced: AMCA 204 - Balance Quality and Vibration Levels for Fans.
- B. Performance Ratings: Determined in accordance with AMCA 210 and bearing the AMCA Certified Rating Seal.
- C. Sound Ratings: AMCA 301, tested to AMCA 300 and bearing AMCA Certified Sound Rating Seal.
- D. Fabrication: Conform to AMCA 99.
- E. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.
- F. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.02 UTILITY VENT SET

- A. Manufacturers:
 - 1. Greenheck Fan Corporation: www.greenheck.com/#sle.
 - 2. Loren Cook Company: www.lorencook.com/#sle.
 - 3. PennBarry, Division of Air System Components: www.pennbarry.com/#sle.
 - 4. Twin City Fan & Blower; BCV: www.tcf.com/#sle.

5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Direct Drive Fan:
 1. Fan Wheel:
 - a. Type: Non-overloading, backward inclined centrifugal.
 - b. Material: Steel.
 2. Statically and dynamically balanced.
 3. Motors:
 - a. ECM Motor
 - b. Heavy duty ball bearing type.
 - c. Mount on vibration isolators or resilient cradle mounts, out of air stream.
 - d. Fully accessible for maintenance.
 4. Housing:
 - a. Construct of coated steel including curb cap, windband, and motor compartment.
 - b. Rigid internal support structure.
 - c. One-piece fabricated or fully welded curb-cap base to windband for leak proof construction.
 - d. Construct drive frame assembly of heavy gage steel, mounted on vibration isolators.
 - e. Provide breather tube for fresh air motor cooling and wiring.
- C. Shafts and Bearings:
 1. Fan Shaft:
 - a. Ground and polished steel with anti-corrosive coating.
 - b. First critical speed at least 25 percent over maximum cataloged operating speed.
 2. Bearings:
 - a. Permanently sealed or pillow block type.
 - b. Minimum L10 life in excess of 100,000 hours (equivalent to L50 average life of 500,000 hours), at maximum cataloged operating speed.
 - c. 100 percent factory tested.
- D. Drive Assembly:
 1. Belts, pulleys, and keys oversized for a minimum of 150 percent of driven horsepower.
 2. Belts: Static free and oil resistant.
 3. Fully machined cast iron type, keyed and securely attached to the wheel and motor shafts.
 4. Motor pulley adjustable for final system balancing.
 5. Readily accessible for maintenance.
- E. Disconnect Switches:
 1. Factory mounted and wired.
 2. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Outdoor Locations: Type 3R.
 3. Finish for Painted Steel Enclosures: Provide Hi-pro polyester coated on all parts including fan wheel unless otherwise indicated.
 4. Positive electrical shutoff.
 5. Wired from fan motor to junction box installed within motor compartment.
- F. Drain Trough: Allows for single-point drainage of water, grease, and other residues.
- G. Options/Accessories:
 1. Dampers: Provide gravity type.
 2. Drain Connection:
 - a. Allows single-point drainage of grease, water, or other residues.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

- B. Secure roof exhausters with cadmium plated steel lag screws to roof curb.
- C. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.
- D. Provide sheaves required for final air balance.

END OF SECTION

SECTION 23 3700 - AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Diffusers.

1.02 REFERENCE STANDARDS

- A. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Inlets; 2006 (Reaffirmed 2011).
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.

1.04 QUALITY ASSURANCE

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Krueger-HVAC, Division of Air System Components: www.krueger-hvac.com/#sle.
- B. Price Industries: www.price-hvac.com/#sle.
- C. Titus, a brand of Air Distribution Technologies: www.titus-hvac.com/#sle.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 RECTANGULAR CEILING DIFFUSERS

- A. Type: Provide Square plaque diffuser to discharge air in four way pattern with sectorizing baffles where indicated.
- B. Connections: Round.
- C. Frame: Provide inverted T-bar type. In plaster ceilings, provide plaster frame and ceiling frame.
- D. Fabrication: Steel with baked enamel finish.
- E. Color: As indicated.
- F. Accessories: Provide radial opposed blade volume control damper; removable core with damper adjustable from diffuser face.

2.03 PERFORATED FACE CEILING DIFFUSERS

- A. Type: Perforated face
- B. Frame: Inverted T-bar type.
- C. Fabrication: Steel with steel frame and baked enamel finish.
- D. Color: As indicated.
- E. Accessories: Radial opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.

- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

END OF SECTION

SECTION 23 8101 - TERMINAL HEAT TRANSFER UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fan-coil units.

1.02 RELATED REQUIREMENTS

- A. Section 23 2113 - Hydronic Piping.
- B. Section 23 2114 - Hydronic Specialties.
- C. Section 23 0993 - Sequence of Operations for HVAC Controls.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 FAN-COIL UNITS

- A. Manufacturers:
 - 1. Daikin Applied: www.daikinapplied.com/#sle.
 - 2. Trane Inc: www.trane.com/#sle.
 - 3. Enviro-Tec.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Coils: Evenly spaced aluminum fins mechanically bonded to copper tubes, designed for 200 psi and 220 degrees F. Provide drain pan under cooling coil, easily removable for cleaning, with drain connection.
- C. Cabinet: 0.0598 inch steel with exposed corners and edges rounded, easily removed panels, glass fiber insulation and integral air outlet.
- D. Finish: Factory apply baked primer coat on visible surfaces of enclosure or cabinet.
- E. Fans: Centrifugal forward-curved double-width wheels, statically and dynamically balanced, direct driven.
- F. Motor: Tap wound multiple speed permanent split capacitor with sleeve bearings, resiliently mounted.
- G. Control: Multiple speed switch, factory wired, located in cabinet.
- H. Filter: Easily removed 1 inch thick glass fiber throw-away type, located to filter air before coil.

2.02 HYDRONIC RADIANT HEATERS

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install equipment exposed to finished areas after walls and ceiling are finished and painted. Do not damage equipment or finishes.
- C. Fan-Coil Units: Install as indicated. Coordinate to assure correct recess size for recessed units.
- D. Hydronic Units: Provide with shut-off valve on supply and lockshield balancing valve on return piping. If not easily accessible, extend vent to exterior surface of cabinet for easy servicing. For cabinet unit heaters, fan coil units, and unit heaters, provide float operated automatic air vents with stop valve.
- E. Units with Cooling Coils: Connect drain pan to condensate drain.

END OF SECTION

SECTION 26 0500 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Work included in these specifications and included on the drawings shall include furnishing all labor, materials, supplies, and equipment to perform all work required including cutting, channeling, chasing, excavating and backfilling, demolition (if any) to install a complete and working electrical system(s) in accordance with these sections of the specifications and the accompanying drawings. This shall include all required preparation work, demolition, raceways, coordination, etc. required to install the electrical system.
- B. It is recognized that separate subcontracts may be instituted by the General Contractor or the Division 26 Contractor with other contractors and/or suppliers. It is the responsibility of the Division 26 Contractor to completely inform, coordinate and advise those subs as to all of the other requirements, conditions and information associated with providing and installing the total job.
- C. The electrical work shall include, but in no way be limited to the following:
 - 1. Raceways Systems
 - a. Power
 - b. Voice/Data
 - 2. Empty Raceways
 - a. Fire Alarm System Additions
 - 3. Electrical Distribution System
 - 4. Power Systems
 - a. Interior
 - b. Exterior
 - 5. Wiring Devices
 - 6. Fire Alarm System Additions
 - 7. Electrical Demolition
 - 8. Connection and/or Installation of Devices or Support for Installation of Systems furnished under other divisions of the Project Manual including but not limited too:
 - a. Building Automation and Control Systems
 - b. Detection and Alarm Systems

1.02 RELATED SECTIONS

- A. Drawings and specifications including General Conditions, Supplementary Conditions and Division 01 specification sections, apply to work of this and all sections in Division 26. Division 26 General Provisions described in this section apply to all sections of Division 26.

1.03 SPECIFIED MATERIALS:

- A. Throughout the drawings and specifications, equipment and systems have been selected and are referenced by name, manufacturer, model number, etc. These references are not intended to limit competition. Products by other listed manufacturers will be acceptable.
- B. If a listed manufacturer other than the basis of design is used, it is the contractor's responsibility for changes in dimension, structural, electrical changes, etc. required for proper installation, function and final performance.

1.04 SUBSTITUTION OF SPECIFIED MATERIALS:

- A. Throughout the drawings and specifications, equipment and systems have been selected and are referenced by name, manufacturer, model number, etc. These references are not intended to limit competition and in most cases materials and methods of construction equal to that specified will be accepted provided prior approval of any substitute item is obtained from the Architect/Engineer. Only products by the listed manufacturers will be acceptable. Contractors and other manufacturers may submit requests to be listed as an acceptable manufacturer on the specified item by submitting documentation in accordance with the requirements of Section

01 6000. All bidders will be notified by addendum of any approved substitutions. Under no circumstances will any substitutes be accepted after that date; and any item installed on the job which has not been approved in accordance with the noted procedure shall be removed and replaced with the appropriate approved item at the contractor's expense.

- B. In all cases the contractor shall be completely responsible for changes in dimension of other than first named manufacturer equipment, electrical changes, etc. required for proper function and final performance. Item shall comply with all requirements herein set forth and as required to perform as designed.

1.05 REFERENCES

- A. The Contractor is responsible for obtaining all required permits and complying with the current editions, or the editions referenced in the other individual sections of these specifications, of all applicable National (NEC, IBC, NFPA), State, County, and Municipal codes and regulations. This shall include, but not be limited to, the following:
 - 1. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association.
 - 2. NFPA 70 - National Electrical Code
 - 3. NFPA - National Fire Protection Association
 - 4. Federal Occupational Safety and Health Act (OSHA)
 - 5. Americans with Disabilities Act (ADA).
 - 6. International Building Code (IBC)
 - 7. International Fire Code
- B. Unless noted otherwise, the contractor shall comply with the latest edition and update of any and all codes and standards.
- C. Compliance with Underwriters Laboratories: All products installed under the contract shall have the Underwriters Laboratories (UL) label where such marking is available. Products which are not UL labeled will not be acceptable if labeled products are available from another approved manufacturer.
- D. The above listed requirements are required of the electrical contractor by this contract whether these requirements are shown on the drawings, mentioned in the specifications or not.
- E. All work and equipment installed that does not comply with the codes and standards noted above shall be corrected and/or replaced (at engineer's option).
- F. The contractor(s) shall submit all items necessary to obtain all required permits to the appropriate Federal/State/County/City agencies, obtain all required permits, and pay for any and all required fees.

1.06 DEFINITIONS

- A. Concealed - Embedded in masonry or installed within other building elements including but not necessarily limited to crawl spaces, spaces above ceilings, in walls, in chases, shafts . It shall also include conduit installed in the ground beneath a floor slab. Not visible.
- B. Exposed - Installed in such a manner that it can be seen. All exposed materials shall be installed in a neat manner. If in the engineer's opinion the installed materials are not installed in a neat manner, it shall be removed and reinstalled to the satisfaction of the engineer.
- C. Furnish - When used in the Division 26 plans and/or specifications the word "furnish" shall mean to purchase a piece of equipment or material and to have said equipment/material transported to the project site (or other location if so directed). All items to be furnished shall include any and all mounting hardware, support, and accessory required for installation and proper operation. Unless otherwise noted, when a piece of equipment or material is to be furnished by the contractor, it shall also be installed.
- D. Provide - When used in the Division 26 plans and/or specifications the word "provide" shall mean to furnish and install complete and ready for use and to put into operation. Include any and all options, accessories, and mounting/installation hardware required for a complete and operating system or element of the electrical system.

- E. Install - When used in the Division 26 plans and/or specifications the word "install" shall mean to unload and transport the equipment/material to the installation point of the job site. Any and all mounting hardware (whether specified or called for by name / model number, or not) shall be included. Perform every operation necessary, including any and all final adjustments, etc. required for proper operation.
- F. Controlled - When used in the Division 26 plans and/or specifications, the word "controlled" shall mean to govern delivery of operating voltage or power to equipment or systems by means of, but not limited to, feeders, disconnects, breakers, switches, starters, etc..

1.07 COORDINATION OF WORK IN OTHER SECTIONS

- A. The Division 26 contractor is responsible for including any and all work related to the electrical that is noted in any part of the specifications or any part of the drawings, including Divisions 01, 48 and any other sections.
- B. If any piece of equipment is shown on any part of the drawings ("A" (Architectural) drawings, "M" (Mechanical) drawings, "P" (Plumbing) drawings, or "E" (Electrical) drawings), it is the responsibility of the Division 26 Contractor to furnish and install electrical service as required to that equipment. Do a complete review of all contract documents and include electrical service for all such equipment whether or not it is also shown in Electrical documents. Electrical service shall comply with all requirements of the equipment shop drawings and all codes.
- C. The Division 26 Contractor will supply power to equipment at the voltage indicated on the Division 26 drawings. The Division 26 Contractor and all other contractors will be held responsible for coordinating the equipment voltages, control equipment, wiring, and locations and type of terminations/connections and/or disconnects required to comply with the National Electrical Code, International Building Code, all local codes, and the equipment manufacturer's requirements. If equipment is furnished to the project at a voltage other than that shown on the Division 26 drawings, the contractor supplying the equipment and all other subcontractors will be held responsible for making any necessary adjustments to correct the conflict, to the satisfaction of the Electrical Engineer.

1.08 INTERPRETATION OF THE DRAWINGS AND SPECIFICATIONS (CONTRACT DOCUMENTS):

- A. Refer to the section of the specifications which cover General Conditions, Division 01, and Instructions to bidders. These sections and their requirements are a part of this contract and are binding on this section of the work.
- B. Electrical Drawings are diagrammatic in nature except where specific dimensions, or specific details are shown on the electrical, mechanical, or architectural drawings. The Electrical Contractor shall refer to other drawings for exact locations of equipment, building dimensions, architectural details and conditions affecting the electrical work; however, field measurements take precedence over dimensioned drawings. The Electrical Contractor shall provide all labor and materials and all incidental elements; junction and pull boxes, filters, pull wires, connectors, support materials, fuses, disconnect switches, lamps, and labels, to install, connect, start-up and result in a complete and working system in accordance with the drawings and specifications. Unless noted otherwise on the plans or in these specifications, all final connections are the responsibility of the Division 26 Contractor.
- C. In order to show the electrical work required under this contract on the drawings, it is necessary to utilize symbols and schematic diagrams/details. These symbols and schematic diagrams/details do not have any dimensional significance nor do they delineate every item required for the intended installations. The work shall be installed in accordance with the intent diagrammatically expressed on the drawings, and in conformity with the dimensions indicated on the final architectural and structural working drawings and on equipment shop drawings. No interpretation shall be made from the limitations of symbols and diagrams that any elements necessary for complete work are excluded.
- D. When the details of specific and/or general installation requirements show specific dimensioning and/or positioning requirements of the items to be installed, these dimensions shall be field

verified and followed. It is the intent of these details to only establish the general feasibility of the work required. These details in no way delete, reduce, or substitute the requirement of field coordination for the indicated work.

- E. The contractor is responsible for coordinating the installation of all electrical work with the work of other contractors and/or trades. This contractor shall refer to the other drawings (demolition, site, civil, architectural, kitchen, structural, plumbing, mechanical, etc.) to assure that the installed electrical work is installed in a coordinated fashion. Conflicts on installation work due to the lack of proper coordination of this contractor shall result in the work being removed and coordinated and properly reinstalled. Report to the Engineer any and all discrepancies that the contractor(s) find in the field between the electrical drawings and the other drawings.
- F. The installation of any and all equipment/systems is subject to clarification as indicated in the review comments of the Engineer on the shop drawings. The contractor shall be aware that if the equipment of an approved equal manufacturer is to be installed, the equipment, controls, functions, conduit routing, power requirements, etc. may be different. It is the responsibility of the electrical contractor to coordinate the installation requirements of the equipment to be installed with the electrical plans of the specified equipment/systems. If there are any additional equipment, power service, conduit, conductors, controls, etc. required to install the approved equal equipment, these additional requirements shall be furnished and installed.
- G. The electrical drawings are such that the electrical service to equipment furnished and installed under other sections of the contract documents (examples, but not limited to: elevators, kitchen equipment, HVAC equipment, water heaters, fans, pumps, motors, etc) is coordinated for the specified equipment only. If the equipment installed under other divisions of the contract documents is not the specified equipment and is an approved equal to the specified equipment, it is possible that the equipment will require different electrical service/interface than that shown on the electrical plans for the specified equipment. In this case, it is the responsibility of the approved equal installing contractor / manufacturer to coordinate the electrical service/interface requirements with the electrical contractor. If the electrical service/interface requirements of the substituted equipment are greater than the specified equipment and result in an increased electrical cost, it is the responsibility of the furnishing/installing contractor to pay the electrical contractor for the increase in electrical cost.
- H. Submission of a proposal and ultimate acceptance of an agreement or contract for execution of this section of work will be construed as evidence that the Electrical Contractor and each interested Subcontractor and/or vendor has carefully read and accepts all conditions set forth in each Division under specification Divisions titled "Instructions To Bidders" and Division 01, "General Conditions", in so far as such conditions may affect both the bidding for and execution of this section of work.

1.09 ELECTRICAL SYSTEMS

- A. All electrical systems shown on the plans or specified in the Construction Manual shall have equipment furnished and installed so that the system is a complete and functioning system that complies with the intent of the specifications, whether each and every element of each and every system is specified or not. Any and all equipment, options, and system elements necessary for proper operation shall be furnished and installed, whether specifically called for (specified by name or catalog number) or not.

1.10 SPECIAL ELECTRICAL REQUIREMENTS

- A. Provide all wiring, connectors, fittings, connections, and all accessories for the complete installation of, and final connections to, equipment furnished under other divisions of the specifications and where indicated on the electrical drawings or otherwise specified.
- B. The Electrical Contractor shall coordinate with all other contractors the electrical service provided as shown on the electrical plans with respect to voltage, phase, and ampacity. This coordination shall take place before any equipment is ordered and is for the purpose of the contractor providing equipment that requires electrical connection ordering the correct

equipment to match the electrical service provided. Any changes in the characteristics of the circuits that serve any electrically operated equipment shall be made.

- C. Make all final connections to all equipment, provided under the electrical contract and equipment provided under other sections, except where noted on the plans to provide "rough-in only". Where connections are to be made by someone other than the Division 26 contractor, coordinate with the equipment supplier to determine the rough-in requirements. In the case where rough-in is installed now but equipment unknown or is to be installed in the future, install outlet box sized for the conductors installed, install conductors and leave 8" of pigtails for each conductor. Tape all conductors, leave a note in the box as to the panel the circuit is connected, and install a cover plate over the outlet box. In the panel that the circuit terminates, do not connect the circuit to a breaker, tag the circuit with information as to the location of the outlet box, and leave enough pigtail in the panel so that connection can be made to any breaker space in the panel.
- D. The Electrical Contractor is hereby alerted that certain features of control, other functions, or systems may be specified in this division by performance, and as such, all elements of wiring or other materials and devices for the complete installation may not be shown on the drawings. The Electrical Contractor shall provide for the final and complete installation of all features called for by drawings or specifications.
- E. Note that the Mechanical Division includes furnishing all motors for equipment furnished and installed by Division 23. In addition, unless otherwise shown on the electrical drawings, starters for Division 23 equipment shall also be provided by Division 23. The Division 26 work shall include installing all of the individually mounted, stand alone starters and the power wiring from the electrical system through ALL motor starters to the final connection to the motors. The only exception for this requirement of the Division 26 scope furnishing and installing starters shall be where the Division 23 equipment has a control panel that includes the starter and/or disconnect. Coordinate with Division 23.
- F. Where equipment is prewired, the power wiring shall extend to the power terminals of the pre-wired equipment. Control wiring for the mechanical equipment and temperature control wiring is covered under Division 23 and is not a part of Division 26 unless specifically noted.
- G. All safety disconnect switches shall be provided under Division 26 except where the Division 23 equipment is equipped with factory installed disconnects. Where the switch designation calls for the switch to be fused, the electrical contractor shall furnish and install fuses that are sized in accordance to the equipment nameplate of the equipment served.
- H. In order to comply with the seismic codes, all recessed light fixtures shall be supported with four (4) hanger wires which shall be tied to the structure.

1.11 DIMENSIONS ON DRAWINGS, IN FIELD, VERIFICATION

- A. The contractor shall be responsible for visiting the site in order to become familiar with existing conditions and coordinating the required work as needed. No increase in contract cost will be considered due to the contractor not being aware of existing conditions.
- B. Do not scale drawings. Confirm all dimensions in the field. Coordinate all installations with shop drawings and other contractors work. Where discrepancies are found on the contract documents, the contractor shall include in the project cost any and all materials, items and labor required to make any and all changes required to install the work correctly. Where discrepancies are found on the project the contractor shall stop work in that area and contact the engineer.

1.12 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Required submittals are listed with each section of the electrical specifications.

1.13 RECORD DRAWINGS

- A. The electrical contractor shall keep a set of construction drawings during the length of the project on which he shall note any and all changes from the original drawings. Of special importance is noting the actual location of all service entrances into the building and where conduit stub outs have been installed. This record set of drawings shall be updated daily. The drawings shall be neat, orderly and marked in a way to be clearly interpreted. The record drawings shall be turned over to the Architect to update drawing files for a final set of drawings for the owners record.
- B. When the submitted information has been deemed satisfactory and all information has been transferred by the architect to the drawing files, they shall be labeled as "RECORD DRAWINGS" and copies turned over to the owner. Only then will final approval and payment be approved.
- C. After the "RECORD DRAWINGS" have been approved by the Engineer, the contractor shall have one set of prints made from the "Record Drawings" and shall wall mount a 4" PVC tube with screw on cap in the main electrical room and place the set of prints in this tube.

1.14 CHANGE ORDERS

- A. Change orders will not be issued for relocating electrical equipment or rerouting conduit and wiring. This section of the electrical specifications require that relocating of electrical equipment or rerouting of conduit/wiring be done at no additional cost to the Owner.
- B. When change orders are required for electrical work, the unit material and unit labor method shall be used. Unit values for material shall be contractors' net cost from distributor. Unit values for labor hours shall not be greater than those listed in the latest addition of Means mechanical/electrical cost data. Sales tax is to be added to materials and workman's compensation insurance is to be added to labor. Overhead and profit markup is to be added to the materials and labor subtotal per the instructions in Division 01.
- C. To calculate a credit for deleted work, the identical method of calculations shall be used for deleted work that is used for new work. No money will be allowed for lost scheduling time or estimation time. The Engineer agrees to expedite change orders as rapidly as possible to avoid construction delay. The contractor may be required to estimate a number of alternatives for change orders in order to arrive at the lowest cost for change orders.
- D. There shall be no additional cost for the contractor to estimate multiple alternatives for consideration.

1.15 QUALITY ASSURANCE

- A. The contractor performing the electrical work shall employ craftsmen who are thoroughly experienced and trained in the installation of electrical systems and general installation coordination. All work shall be done in the highest level of standards for the trade. Any work installed at a level that is less than the highest level of standards for the trade shall be removed and reinstalled in the manner described above.
- B. All equipment shall be installed in compliance with the manufacturer's published installation recommendations and requirements, with any and all required accessories and mounting hardware, and/or as approved by the Engineer. The manufacturer's published installation requirements and recommendations shall become a part of the Owner's Manual (See Paragraph 1.15)

1.16 OPERATING AND MAINTENANCE MANUALS:

- A. The Manuals generally include all project submittals updated to reflect actually installed conditions; operating instructions; maintenance schedules; training material; warranty and bonds; and contact information for sales, warranty and service of equipment. Refer to Division 01 of the specifications for complete requirements.
- B. Provide manuals for each product or system.

1.17 TRAINING AND INSTRUCTIONS:

- A. The Contractor shall provide training and instructions by knowledgeable representatives of the products installed to fully train and instruct representatives of the using agency in the location, function and operation of devices, equipment and systems installed under Division 26. The instruction shall include maintenance procedures for all such items. See specific sections in the Project Manual for devices, equipment and systems for detailed requirements for training and instructions.

1.18 DELIVERY, STORAGE, AND PROTECTION

- A. Where equipment is purchased by the electrical contractor to be installed in conformance with the contract documents, the contractor shall follow the following procedure as it relates to delivery, storage, and installation:
 1. Coordinate any and all information with any and all contractors who are to do work to accommodate the division 26 equipment/work.
 2. Coordinate delivery of equipment.
 3. Unload the equipment from delivery trucks.
 4. Inspect equipment for damage. Report damage immediately and arrange for the equipment to be repaired or replaced. No claims for time extensions or additional work related to the damage will be accepted if not made within ten days of the delivery of the equipment.
 5. Inspect the equipment to assure correct make, model number, voltage, etc.
 6. Provide for safe handling and field storage up to the time of permanent placement in the project.
 7. Provide for any and all field assembly and internal connection as may be necessary for proper operation.
 8. Install in place including any and all required mounting supports, connectors, fittings, connections, and accessories required for complete system operation.

1.19 MANUFACTURER'S FIELD SERVICES:

- A. Provide manufacturers field services where required under the specific sections of the Project Manual using authorized and trained manufactures representatives of the equipment or systems in question. The field services shall include the following as a minimum:
 1. Inspect the installation to verify that the installation meets or exceeds all manufacturer's requirements and recommendations for proper operation.
 2. Start/energize the equipment and verify that the equipment/system is operating and functioning as required by these specifications and the manufacturer's requirements.
 3. Provide written certification that field services have been performed and that equipment/system is operating and functioning as required by these specifications and the manufacturer's requirements. Submit the certification as part of the closeout documents.
- B. Refer to specific sections of the Project Manual and provide all field service requirements listed in addition to these general requirements.

1.20 WARRANTY

- A. All work, equipment, and materials shall be new and without defects or blemishes, and guaranteed to be free from defects for a period of one (1) year after the final date of project acceptance as defined by the Architect (NOT THE DATE OF INSTALLATION OR START-UP). All installation and installation materials shall also be guaranteed for the one (1) year period. This shall cover such items as equipment pads, supports, leaks from around equipment installation, etc and is intended to cover everything installed or provided under this division of the contract.
- B. Manufactured pieces of equipment shall have their guarantee also backed by the equipment manufacturer.

- C. During the guarantee period there shall be no charge to the Owner for items and work done under the guarantee clause (Service calls). This shall apply to replacement equipment, equipment shipping charges, mileage, labor, all taxes, etc.
- D. Refer to the other sections of the Project Manual for warranty requirements that may exceed these general requirements and follow those requirements for the equipment, devices, materials or systems in question.
- E. See Section 01 7000 - Execution and Closeout Requirements, for additional warranty requirements.

PART 2 PRODUCTS

2.01 GENERAL:

- A. All products shall be of new manufacturer (unless the plans and/or other sections of this specification call for existing or other identified products to be used), age of less than one year, and the latest model of a manufacturer. A new product shall not be used if the manufacturer has introduced a product as a replacement. All materials and apparatus for the work shall be furnished, delivered, erected, connected and finished in every detail, and shall be so selected and arranged as to fit into the building spaces in compliance with all code requirements.
- B. All equipment that is provided by the contractor, subcontractors, or specialty subcontractor (fire alarm, etc) to be installed at the project site, shall be purchased, installed and maintained by the local (to the project site) authorized, licensed, factory distributor/installer/supplier. The contractor shall include with the submittals, verification in writing from the manufacturer, that the supplier and/or distributor is a factory authorized and licensed by the manufacturer to provide, install, and maintain (throughout the entire length of the warranty period) the equipment. THERE SHALL BE NO EXCEPTIONS TO THIS REQUIREMENT.
- C. By providing equipment to the project, a manufacturer guarantees to provide replacement parts for the equipment for a period of five (5) years, even if the item provided goes out of manufacture.
- D. Manufacturer's catalog numbers listed are not necessarily complete and are for general identification only. It is the responsibility of the Contractor to provide complete catalog numbers and to provide all accessories for installation as implied by the accompanying description of the equipment, material or device, the demonstrated use on the drawings, and the specifications contained herein. Products provided shall be a standard product which has a history of successful installation and operation for a minimum period of two years. Prototype or custom made equipment is not acceptable unless so specified herein.
- E. Manufacturer's instructions shall be obtained by the Contractor and used for the installation of all equipment and devices where such manufacturer's instructions are available.
- F. Where a substituted product is used instead of the specified product, the contractor will assume any and all responsibility for the product to fit, function and perform as well as the specified product. The opinion of the engineer will be binding and shall govern all parties as to a substituted product performing as well as the specified product.
- G. Completeness: Provide all boxes, off-sets, bends, raceways, devices, raceway supports, installation brackets and supports, flexible connections, wiring connectors, labels and terminals for the complete installation and operation of all products. Each unit of product shall be assembled and installed and all surfaces shall be clean and free of dents, scratches, and abrasions or marred areas.

2.02 IDENTIFICATION

- A. All equipment shall be marked and/or identified so that maintenance crews can locate equipment.
- B. All equipment items; switchboards, distribution, power, receptacle and lighting panelboards, transformers, disconnects, motor control centers, switches, lighting contactors and wiring gutters, of the electrical system shall be labeled. Each distribution switch and circuit breaker in

a switchboard, or individually mounted, shall be labeled. These labels shall be engraved, black laminated plastic labels, with 1/2 inch white letters. For equipment connected to the emergency power system, the labels shall be red laminated plastic with white letters. Attach the labels to the equipment with two sheet metal screws or rivets.

- C. Circuit breakers in distribution panels (panels with hinged doors) shall be labeled by means of a typed circuit breaker directory. For all breakers serving lighting, receptacle, and HVAC circuits, the contractor shall include on the panel schedule by the breaker number the room number(s) served by the circuit. The room number(s) shall be the same number(s) as the room number(s) on the door, not the space number as shown on the plans. See Section 26 2416.
- D. Wire and cable identification shall be made so that all wire and cable can be identified by means of color coding as noted in Section 26 0553. Wiring marker for use in wire and terminal identification shall be white cloth backed with a rubber based, pressure sensitive adhesive labels. Each wire or cable in a feeder at its terminal points, and in each pull-box, junction box, and panel gutter through which it passes shall be identified. Where two or more feeders enter or leave a device or enclosure, the cable shall be tagged to indicate destination of cable run. Each common wire, common circuit or common loop of a system, fire alarm, sound system, or TV system, shall be identified.
- E. Device plates for local toggle switches, toggle switch-type motor starters, pilot lights, and the like, whose function is not readily apparent shall be labeled suitably describing the equipment controlled or indicated. These labels shall be engraved, black laminated plastic labels, with 1/4 inch white letters. For equipment connected to the emergency power system, the labels shall be red laminated plastic with white letters. Attach the labels to the equipment cover plates with glue recommended by the manufacturer.
- F. Where used with an empty raceway for wires of a future system, each box or cabinet shall be identified on the inside by means of indelible markings indicating the system for which it is installed. Label any junction box, which includes wiring, with indelible markings on the outside showing system and voltage.

PART 3 EXECUTION

3.01 GENERAL

- A. Before any work is started, the electrical contractor shall coordinate the work of other contractors that will affect the work of the electrical contractor. The electrical contractor shall inspect the work of all other trades to determine if the other work is ready for the electrical contractor to start his work.
- B. Any and all electrical installations shall be coordinated with other trades, contractors and the Owner.
- C. The contractor shall make himself familiar with existing conditions, site information, etc. so that conflicts are avoided.
- D. All work shall be installed per all applicable code, rules, regulations, shop drawings and manufacturer's installation recommendations.
- E. The electrical contractor shall be responsible for returning to original, pre-construction condition, any paved areas, sidewalks, planting, walls, and other areas disturbed during electrical installation work.
- F. The electrical equipment shall be installed as close as possible to the location as shown on the plans. If during the installation, it is required to install equipment in locations other than the one shown on the plans, the contractor shall make a sketch of the proposed changes, submit it to the Engineer, and after the Engineer has given approval, then proceed with the installation.
- G. Working spaces and clearances shall not be less than the required minimums in the National Electric Code (NEC).

3.02 EXAMINATION

- A. The Electrical Contractor is responsible for visiting and examining the site to determine those portions of the site or present buildings affected by this work so as to become familiar with existing conditions and difficulties that will attend the execution of the work, before submitting proposals.
- B. Submission of a proposal will be considered as evidence that such examination has been made and later claims for labor, equipment, or materials because of difficulties encountered, which could have been foreseen had such examination been made, will not be recognized.

3.03 ADDITIONS RENOVATIONS AND REMODELING

- A. All electrical work shall be coordinated and phased so as to assure electrical service to any other buildings or parts of buildings that require use during construction.
- B. All existing electrical system elements shall be protected from damage during any and all additions, renovations, and remodeling.
- C. All new electrical equipment and installations shall be installed and connected to existing work or existing electrical system elements in a neat and careful manner. Any existing electrical work or system elements that are disturbed or damaged shall be replaced or repaired to the pre-construction condition.

3.04 LOCATIONS OF EQUIPMENT REQUIRING ELECTRICAL SERVICE AND CONNECTIONS:

- A. Coordinate the exact installed location of equipment that requires electrical connections that is furnished and installed by other contractors. The electrical drawings try to show the correct location of all of these items, but it is the responsibility of the electrical contractor to coordinate with all other contractors to determine the exact installed location of all equipment furnished and installed by other contractors and wired by the electrical contractor. Such coordination shall include, but not limited to exact location, location of electrical connection, type of connection required, and electrical characteristics.

3.05 OPENINGS, CUTTING AND PATCHING:

- A. Contractor shall arrange for openings in the building structure or components to allow for installation of electrical work or transport of electrical equipment as the project progresses.
- B. Any cut portion of the building, wall, sidewalk, paved drives, ceiling, floors, roofs, etc., install any raceway or apparatus or transport equipment, shall be restored in a manner such that the end product complies with the specification for that type of work. Where existing work is cut, restore to the original (pre-construction) condition. The electrical contractor shall be responsible for returning to original, pre-construction condition, any of the above noted areas or other areas disturbed during electrical installation work.
- C. Structural, load bearing, or supporting device shall not be cut without approval in writing from the Architect.

3.06 LOCATIONS OF OUTLET BOXES FOR EQUIPMENT AND GENERAL WIRING:

- A. All outlets for lighting, power, and equipment, not specifically dimensioned are located diagrammatically on the drawings.
- B. Lighting fixtures shall be located in accordance with reflected ceiling plans or tile pattern outlines. If neither is indicated, lighting fixtures shall be symmetrical within the space in which they are located. The Contractor shall be responsible for coordinating with the architectural and mechanical plans and to the shop drawing of the equipment to be installed for the exact location of the outlets required for equipment installation.
- C. Lighting fixtures and convenience outlets shall be located so that they will be symmetrical with architectural details.
- D. Equipment outlets shall be located so as to serve the equipment directly. It is the Contractor's responsibility to coordinate outlet location with equipment so that all outlets are accessible and disconnect switches have clearance for operation.

- E. Where outlets are shown to be installed over casework or counters, the Contractor shall be responsible for coordinating the outlet box installation with the architectural details so that the bottom of the box is installed 6" above the counter/casework. Where a back splash is to be installed on the counter/casework, install the bottom of the box 4" above the top of the back splash.
- F. If so directed by the Architect / Engineer / Owner, any outlet box may be moved 10 feet in any direction.

3.07 PAINTING:

- A. Exposed conduit, ungalvanized troughs, metal frames and support racks and wooden surfaces provided under this section shall be painted. Paint color shall match and be the same paint as the room finish paint unless noted elsewhere on the plans or in the specifications. Clean surfaces completely of all oil, wax, rust and old paint prior to repainting. Paint shall be applied to backup boards before switches, troughs, and devices are installed. Paint shall include a primer and two coats of finished paint. Touch-up scratched, or marred surfaces of lighting fixtures and equipment with paint obtained from the equipment manufacturer especially for that purpose.

3.08 ELECTRICAL SYSTEM TESTING:

- A. At the time of the final inspection, or at such times as parts of the system may be completed, all electrical systems shall be tested for compliance with the specifications. The Contractor shall provide all personnel and equipment; current, voltage and resistance measuring instruments, ladders and lights to assist the Engineer in conducting the tests. Authorized representatives of the manufacturer shall be present to demonstrate compliance with specifications of their specific system.
- B. The Contractor shall remove equipment covers as directed for inspection of internal wiring. Accessible ceiling shall be removed as directed for inspection of equipment above the ceilings. After inspection and correction of any problems found, the Contractor shall replace all cover plates, access plates and removable ceiling.
- C. The life safety system shall be demonstrated to function in accordance with the specifications. Each device shall be tested for proper operation.

3.09 CLEANING:

- A. At completion of the work the Contractor shall clean all exposed elements of the electrical system so that all markings deteriorating the original finish appearance are removed. All lighting fixtures, lenses, and reflectors shall be cleaned inside and out and all lamps shall be left clear of dust, dirt, and grime.
- B. The Contractor shall specifically examine the interiors of panelboard cans, equipment cabinets, lighting fixtures, junction boxes, and like components where conduit and wire connections have been made, and all resulting wire ends, insulation cuttings, knock-out plugs, metal filings and any other trash shall be removed so that interiors and exteriors are left free of all debris.

END OF SECTION

SECTION 26 0501 - ELECTRICAL DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical demolition.

1.02 RELATED REQUIREMENTS

- A. Section 01 7000 - Execution and Closeout Requirements: Additional requirements for alterations work.

1.03 ADMINISTRATION

- A. It is not possible to delineate the full scope of the demolition work in the construction documents due to the inaccuracy of existing drawings and sometimes lack of drawings or other documentation entirely. Field work by the Architect and Engineer is also limited in scope and yields limited results from factors that include lack of existing documentation and limited access. Therefore the Contractor must make reasonable allowances for work not reflected by the Construction documents based on the Contractor's experience. Do not completely rely on the Demolition plans to identify circuiting and the safe removal of power from circuits to perform work. It is the responsibility of the Contractor to trace out and verify circuit conditions by taking voltage measurements, using circuit tracers or other methods to verify circuit status.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION

- A. All demolition work shall be performed with due care and diligence so as to prevent the unnecessary destruction and/or damage to systems that shall remain in operation at the conclusion of the project. Determine the exact location of all existing equipment, devices and wiring before commencing work.
- B. Preserve all portions of the existing electrical systems which shall remain.
- C. Verify field measurements and circuiting arrangements shown on Drawings.
- D. Verify that abandoned wiring and equipment serve only abandoned facilities.
- E. Demolition drawings are based on casual field observation and existing record documents. Equipment and circuits have been shown in an approximate way and have not been independently verified by the owner or engineer. Determine all work necessary to renovate, alter, change and repair existing systems based on the actual field conditions. Contractors will be expected to make reasonable assumptions about the work based on their experience with projects of similar scope and size.
- F. Conduit and wiring are not shown on the demolition plan but shall be considered fully a part of the work.
- G. Existing conduit and wiring may be re-used where they are of the type specified, meet the requirements for the new work as defined by the Contract Documents and remain in good condition.
- H. Existing circuitry without a separate grounding conductor shall not be re-used.
- I. Report discrepancies to Owner before disturbing existing installation.
- J. Beginning of demolition means installer accepts existing conditions and agrees to be fully responsible for any and all damages caused by a failure to exactly locate and preserve any and all existing portions of the electrical system.

3.02 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

- B. Coordinate utility service outages with utility company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
 - 2. Make temporary connections to maintain service in areas adjacent to work area.
- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Notify Owner before partially or completely disabling system.
 - 2. Notify local fire service.
 - 3. Make notifications at least 24 hours in advance.
 - 4. Make temporary connections to maintain service in areas adjacent to work area.
- F. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Notify Owner at least 24 hours before partially or completely disabling system.
 - 2. Notify telephone utility company at least 24 hours before partially or completely disabling system.
 - 3. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction. Maintain the continuity of service and grounding to the existing circuits and other system elements contained within the area of construction that serve other areas of the facility and conceal them above ceilings and other building elements in the new construction.
- B. Remove abandoned wiring to source of supply or to the point on a shared circuit from where the equipment of device is served.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- E. Remove and re-install or protect in place all existing equipment and devices shown to remain on or in walls, ceilings and floors which are exposed to demolition and construction activities and which may be damaged by dust, dirt, debris and painting. Where new walls are extended extend boxes and wiring to accommodate new finish.
- F. Replace existing devices shown to remain in operation and their associated coverplates which have been damaged.
- G. Disconnect and remove abandoned panelboards and distribution equipment.
- H. Coordinate disconnect and remove electrical devices and equipment serving utilization equipment that has been removed. Examine the demolition plans of all trades provide electrical demolition services for equipment and devices being removed.
- I. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- J. Provide all cutting and patching to repair any damage caused by construction activities including adjacent construction and finishes damaged during demolition and extension work.

- K. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.
- L. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that remain or that are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide newly revised typed panelboard directories for existing panelboards to reflect new circuit conditions as a result of construction and demolition.
- C. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.
- D. All equipment, devices and materials removed during demolition work and not indicated to be reused or turned over to the owner, shall become the responsibility of the Contractor for disposal.

END OF SECTION

SECTION 26 0501 - ELECTRICAL DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical demolition.

1.02 RELATED REQUIREMENTS

- A. Section 01 7000 - Execution and Closeout Requirements: Additional requirements for alterations work.

1.03 ADMINISTRATION

- A. It is not possible to delineate the full scope of the demolition work in the construction documents due to the inaccuracy of existing drawings and sometimes lack of drawings or other documentation entirely. Field work by the Architect and Engineer is also limited in scope and yields limited results from factors that include lack of existing documentation and limited access. Therefore the Contractor must make reasonable allowances for work not reflected by the Constructions documents based on the Contractor's experience. Do not completely rely on the Demolition plans to identify circuiting and the safe removal of power from circuits to perform work. It is the responsibility of the Contractor to trace out and verify circuit conditions by taking voltage measurements, using circuit tracers or other methods to verify circuit status.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION

- A. All demolition work shall be preformed with due care and diligence so as to prevent the unnecessary destruction and/or damage to systems that shall remain in operation at the conclusion of the project. Determine the exact location of all existing equipment, devices and wiring before commencing work.
- B. Preserve all portions of the existing electrical systems which shall remain.
- C. Verify field measurements and circuiting arrangements shown on Drawings.
- D. Verify that abandoned wiring and equipment serve only abandoned facilities.
- E. Demolition drawings are based on casual field observation and existing record documents. Equipment and circuits have been shown in an approximate way and have not been independently verified by the owner or engineer. Determine all work necessary to renovate, alter, change and repair existing systems based on the actual field conditions. Contractors will be expected to make reasonable assumptions about the work based on their experience with projects of similar scope and size.
- F. Conduit and wiring are not shown on the demolition plan but shall be considered fully a part of the work.
- G. Existing conduit and wiring may be re-used where they are of the type specified, meet the requirements for the new work as defined by the Contract Documents and remain in good condition.
- H. Existing circuitry without a separate grounding conductor shall not be re-used.
- I. Report discrepancies to Owner before disturbing existing installation.
- J. Beginning of demolition means installer accepts existing conditions and agrees to be fully responsible for any and all damages caused by a failure to exactly locate and preserve any and all existing portions of the electrical system.

3.02 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.

- B. Coordinate utility service outages with utility company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
 - 2. Make temporary connections to maintain service in areas adjacent to work area.
- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Notify Owner before partially or completely disabling system.
 - 2. Notify local fire service.
 - 3. Make notifications at least 24 hours in advance.
 - 4. Make temporary connections to maintain service in areas adjacent to work area.
- F. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Notify Owner at least 24 hours before partially or completely disabling system.
 - 2. Notify telephone utility company at least 24 hours before partially or completely disabling system.
 - 3. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction. Maintain the continuity of service and grounding to the existing circuits and other system elements contained within the area of construction that serve other areas of the facility and conceal them above ceilings and other building elements in the new construction.
- B. Remove abandoned wiring to source of supply or to the point on a shared circuit from where the equipment of device is served.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- E. Remove and re-install or protect in place all existing equipment and devices shown to remain on or in walls, ceilings and floors which are exposed to demolition and construction activities and which may be damaged by dust, dirt, debris and painting. Where new walls are extended extend boxes and wiring to accommodate new finish.
- F. Replace existing devices shown to remain in operation and their associated coverplates which have been damaged.
- G. Disconnect and remove abandoned panelboards and distribution equipment.
- H. Coordinate disconnect and remove electrical devices and equipment serving utilization equipment that has been removed. Examine the demolition plans of all trades provide electrical demolition services for equipment and devices being removed.
- I. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- J. Provide all cutting and patching to repair any damage caused by construction activities including adjacent construction and finishes damaged during demolition and extension work.

- K. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.
- L. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that remain or that are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide newly revised typed panelboard directories for existing panelboards to reflect new circuit conditions as a result of construction and demolition.
- C. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.
- D. All equipment, devices and materials removed during demolition work and not indicated to be reused or turned over to the owner, shall become the responsibility of the Contractor for disposal.

END OF SECTION

SECTION 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.

1.02 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Bonding and Equipment Grounding:
 - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 - 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
 - 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 - 1. Provide products listed, classified, and labeled as suitable for the purpose intended.

2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
 1. Use insulated copper conductors unless otherwise indicated.
- C. Connectors for Grounding and Bonding:
 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
 3. Unless otherwise indicated, use mechanical connectors or exothermic welded connections for accessible connections.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Make grounding and bonding connections using specified connectors.
 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
- D. Identify grounding and bonding system components in accordance with Section 26 0553.

END OF SECTION

SECTION 26 0529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

- A. Section 26 0533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- B. Section 26 0533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2013.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
 - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 - 3. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 - 4. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
 - 5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.

- b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
 - c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
- 1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
 - 2. Conduit Clamps: Bolted type unless otherwise indicated.
- C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
- D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
- 1. Comply with MFMA-4.
- E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
- F. Anchors and Fasteners:
- 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
 - 2. Steel: Use beam clamps, machine bolts, or welded threaded studs.
 - 3. Sheet Metal: Use sheet metal screws.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Conduit Support and Attachment: Also comply with Section 26 0533.13.
- I. Box Support and Attachment: Also comply with Section 26 0533.16.
- J. Secure fasteners according to manufacturer's recommended torque settings.
- K. Remove temporary supports.

END OF SECTION

SECTION 26 0533.13 - CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Intermediate metal conduit (IMC).
- C. Flexible metal conduit (FMC).
- D. Liquidtight flexible metal conduit (LFMC).
- E. Electrical metallic tubing (EMT).
- F. Liquidtight flexible nonmetallic conduit (LFNC).
- G. Conduit fittings.
- H. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.
- C. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- D. Section 26 0529 - Hangers and Supports for Electrical Systems.
- E. Section 26 0533.16 - Boxes for Electrical Systems.
- F. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2015.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2015.
- C. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit (EIMC); 2005.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.
- F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2003.
- G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- J. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- K. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.
- L. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- M. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.
- N. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.
- O. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.

2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
 4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
 5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Sequencing:
1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.05 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
- C. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).
- D. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).
- E. Exposed, Exterior: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or PVC-coated galvanized steel rigid metal conduit.
- F. Connections to Vibrating Equipment:
1. Dry Locations: Use flexible metal conduit.
 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.

2.02 CONDUIT REQUIREMENTS

- A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
- B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Minimum Conduit Size, Unless Otherwise Indicated:
1. Branch Circuits: 3/4 inch (21 mm) trade size.
 2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
- E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- B. Fittings:
 - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 INTERMEDIATE METAL CONDUIT (IMC)

- A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- B. Fittings:
 - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.05 FLEXIBLE METAL CONDUIT (FMC)

- A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.

2.07 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use compression (gland) type.
 - a. Do not use indenter type connectors and couplings.

2.08 LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)

- A. Description: NFPA 70, Type LFNC liquidtight flexible nonmetallic conduit listed and labeled as complying with UL 1660.
- B. Fittings:
 - 1. Manufacturer: Same as manufacturer of conduit to be connected.
 - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; suitable for the type of conduit to be connected.

2.09 ACCESSORIES

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil.
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- C. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Install intermediate metal conduit (IMC) in accordance with NECA 101.
- E. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.
- F. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated without specific routing, determine exact routing required.
 - 3. Conceal all conduits unless specifically indicated to be exposed.
 - 4. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms.
 - b. Mechanical equipment rooms.
 - c. Within joists in areas with no ceiling.
- G. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
 - 4. Use conduit strap to support single surface-mounted conduit.
 - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
 - 5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
 - 6. Use of wire for support of conduits is not permitted.
- H. Connections and Terminations:
 - 1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 - 3. Use suitable adapters where required to transition from one type of conduit to another.
 - 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 - 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.

6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- I. Penetrations:
 1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Conceal bends for conduit risers emerging above ground.
 5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
 8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- J. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
 1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
- K. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
 1. Where conduits pass from outdoors into conditioned interior spaces.
 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- L. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.
- M. Provide grounding and bonding in accordance with Section 26 0526.

3.03 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.04 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 26 0533.16 - BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports for Electrical Systems.
- C. Section 26 0533.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
 - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 2. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
 - 3. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
 - 4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for junction and pull boxes.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

- A. General Requirements:
 - 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
 - 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 - 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 - 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
 - 1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 - 2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 - 3. Use raised covers suitable for the type of wall construction and device configuration where required.
 - 4. Use shallow boxes where required by the type of wall construction.
 - 5. Do not use "through-wall" boxes designed for access from both sides of wall.
 - 6. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
 - 7. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 - 8. Minimum Box Size, Unless Otherwise Indicated:
 - a. Wiring Devices: 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
 - 9. Wall Plates: Comply with Section 26 2726.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
 - 1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 - 2. NEMA 250 Environment Type, Unless Otherwise Indicated:
 - a. Indoor Clean, Dry Locations: Type 1, painted steel.
 - b. Outdoor Locations: Type 3R, painted steel.
 - 3. Junction and Pull Boxes Larger Than 100 cubic inches:
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Box Locations:
 - 1. Unless dimensioned, box locations indicated are approximate.
 - 2. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
 - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
 - 3. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 0533.13.
- E. Box Supports:
 - 1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
- F. Install boxes plumb and level.
- G. Install boxes as required to preserve insulation integrity.
- H. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- I. Close unused box openings.
- J. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- K. Provide grounding and bonding in accordance with Section 26 0526.
- L. Identify boxes in accordance with Section 26 0553.

3.03 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.04 PROTECTION

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

SECTION 26 0553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.

1.02 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

1.03 REFERENCE STANDARDS

- A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.
- B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
 - 1. Do not install identification products until final surface finishes and painting are complete.

1.05 SUBMITTALS

- A. Shop Drawings: Provide schedule of items to be identified indicating proposed designations, materials, legends, and formats.
- B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Enclosed switches:
 - 1) Identify voltage and phase.
 - 2) Identify power source and circuit number. Include location when not within sight of equipment.
 - 3) Identify load(s) served. Include location when not within sight of equipment.
 - 2. Use identification nameplate to identify equipment utilizing series ratings, where permitted, in accordance with NFPA 70.
- B. Identification for Conductors and Cables:
 - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
- C. Identification for Raceways:
 - 1. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify circuits enclosed for accessible conduits at wall penetrations, at floor penetrations, at roof penetrations, and at equipment terminations when source is not within sight.

2. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.
- D. Identification for Boxes:
1. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
1. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
 2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
 3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
 4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
 5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.
- B. Identification Labels:
1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
1. Minimum Size: 1 inch by 2.5 inches.
 2. Legend:
 - a. Equipment designation or other approved description.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height:
 - a. Equipment Designation: 1/2 inch.
 5. Color:
 - a. Normal Power System: White text on black background.

2.03 WIRE AND CABLE MARKERS

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- E. Minimum Text Height: 1/8 inch.
- F. Color: Black text on white background unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:

1. Surface-Mounted Equipment: Enclosure front.
 2. Conduits: Legible from the floor.
 3. Boxes: Outside face of cover.
 4. Conductors and Cables: Legible from the point of access.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Mark all handwritten text, where permitted, to be neat and legible.

END OF SECTION

SECTION 26 2813 - FUSES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fuses.

1.02 RELATED REQUIREMENTS

- A. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- B. Section 26 2816.16 - Enclosed Switches: Fusible switches.

1.03 REFERENCE STANDARDS

- A. NEMA FU 1 - Low Voltage Cartridge Fuses; 2012.
- B. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements; Current Edition, Including All Revisions.
- C. UL 248-12 - Low-Voltage Fuses - Part 12: Class R Fuses; Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Bussmann, a division of Eaton Corporation www.cooperindustries.com/#sle.
- B. Littelfuse, Inc www.littelfuse.com/#sle.
- C. Mersen us.mersen.com/#sle.

2.02 APPLICATIONS

- A. General Purpose Branch Circuits: Class RK1, time-delay.
- B. Individual Motor Branch Circuits: Class RK1, time-delay.

2.03 FUSES

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.
- C. Provide fuses of the same type, rating, and manufacturer within the same switch.
- D. Comply with UL 248-1.
- E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.
- F. Voltage Rating: Suitable for circuit voltage.
- G. Class R Fuses: Comply with UL 248-12.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's recommendations and nameplate data for equipment.
- B. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Do not install fuses until circuits are ready to be energized.
- B. Install fuses with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION

SECTION 27 5222 - ADDITIONS TO EXISTING FIRE ALARM AND DETECTION SYSTEM

PART 1 GENERAL

1.01 SCOPE OF WORK:

- A. Furnish and install a complete and working addition to the existing fire alarm system for the facility as shown on the drawings. This shall include, but in no way be limited to the following:
 - 1. Modifications and Additions to the Existing Fire Alarm Control Panel.
 - 2. Additionsl Smoke Detectors.
 - 3. Additional Heat Detectors.
 - 4. Shut down of all HVAC units 2000 CFM and larger.

1.02 RELATED DOCUMENTS:

- A. All provisions of the contract, including General Provisions and Special Provision, apply to the work specified in this section.

1.03 SUBMITTALS:

- A. Furnish manufacturer's data for each component.
- B. Conduit routing and device wiring is not shown on the drawings. The Electrical Contractor shall coordinate with the Fire Alarm manufacturer to determine the conduit (size and routing) and wiring requirements to circuit the equipment shown on the drawings. This information shall be shown and submitted to the Engineer in the form of Submittals (Shop Drawings).
- C. The fire alarm equipment supplier shall provide all necessary approval submittals to show functional suitability of equipment and wiring requirements. The submittal shall contain complete point-to-point wiring diagrams showing all devices connected to the Fire Alarm System, all connection, all junction boxes, and all auxiliary devices and/or connections. A riser diagram shall be included showing number of wires required for each system connection. A color coding scheme shall be indicated. Should one-site conditions require modifications to the indicated circuitry, all such changes shall be noted and all diagrams revised to reflect the changes. Revisions shall show any additions of equipment, rerouting of raceway, modified wiring, additional junction boxes, re-located equipment, and any other changes. One revised set of diagrams shall be stored in the control panel upon completion of the installation.
- D. All wiring for the additional fire alarm equipment shall be the responsibility of, and furnished/installed by, the fire alarm manufacturer and/or his authorized vendor agent.

1.04 CODE STANDARDS:

- A. The total fire alarm system shall comply with all national, state, and local codes. This shall include, but not be limited to the following:
- B. National Electric Code
- C. Standard Building Code
- D. All NFPA Codes
- E. Americans with Disabilities Act (ADA)
- F. ANSI Elevator Code

1.05 QUALITY ASSURANCE:

- A. Equipment shall be by the same manufacturer as the existing system. There shall be no mixing of multiple manufacturer's equipment and/or system elements. Field coordinate to determine the existing equipment manufacturer.

PART 2 - PRODUCTS

2.01 DESCRIPTION:

- A. Furnish and install a complete and operating fire alarm system addition providing all features of the existing system and those features as required by this specification and as shown on plans. The system addition operation shall include individual zone supervision, annunciation by zone

as indicated, smoke door release, battery standby power, double supervision, and non-coded, continuous ringing, with automatic reporting of alarms to the local fire department.

- B. Electrical supervision shall match the supervision of the existing system and shall also include all alarm initiating circuits, all audible and visual alarm signal circuits, all power supplies, sprinkler flow and tamper switches, automatic reporting system, supervisory power and operating power. Failure of any supervised circuit shall operate the system trouble signals. Furnish audible trouble signal silencing switches with ring back or automatic reset feature. Alarm initiating circuits shall be Class B supervised.
- C. Any 'off-normal' condition of any switch in the system shall operate the system trouble signals.
- D. Operation of any manual station, automatic detector, sprinkler flow switch, kitchen hood fire system, rescue assistance needed pull station, etc., in the system shall:
 - 1. Sound all audible alarm horns in the system until reset procedures are initiated.
 - 2. Illuminate the proper zone alarm lamp on the control panel.
 - 3. Flash all visual alarm indicators, when alarm horns are sounding.
 - 4. Shut down all HVAC air handling equipment over 2000 cfm. This includes air handlers and exhaust fans. See HVAC plans and coordinate with the HVAC contractor to determine the HVAC units that are rated 2000 CFM or larger.
 - 5. Capture elevator and return to floor of main egress. If the smoke detector in the main egress lobby is in alarm, the fire alarm controller shall send a signal to the elevator controller which shall send the elevator to the alternate floor of egress (Coordinate with the local Fire Marshall to determine the alternate floor). If the facility has multiple elevators, the fire alarm system shall be capable of returning all elevators as a single group or returning them individually by reconfiguring control devices in the fire alarm control panel (FAC). In the case of multiple elevators in separate locations, coordinate with the Fire Marshall to determine the method of recall desired. If the building is sprinkled, there shall be a heat detector within two feet of each sprinkler head at the top and bottom of the elevator shaft(s) and in the machine room(s) which shall operate the elevator main power shunt trip breaker(s). These heat detectors shall be zoned and/or grouped so that they trip the elevator shunt trip breakers on an individual elevator basis only. Coordinate with the elevator manufacturer. Include any and all additional control devices to accomplish this requirement.
 - 6. Close all doors held open by fire alarm driven door holders.
 - 7. Automatically notify the local fire department. Include any and all equipment required to accomplish this requirement. Any and all equipment shall comply with requirements of the local fire department as to automatic reporting.
 - 8. Open all automatic opening doors.
 - 9. Unlock all doors with electric door locks/strikes (Unless specifically noted otherwise due to a security issue). Contractor shall coordinate with the door schedule to determine the number, quantity, and types of doors with electric locks/strikes. include all required interface equipment in the fire alarm control unit to accomplish this task.
 - 10. Provide interface with all smoke dampers and/or combination smoke/fire dampers to close when the space that the duct that contains the damper is in alarm. Coordinate operational functions with the authority having jurisdiction to comply with all codes and local/state/national requirements. Coordinate with the HVAC contractor and the smoke and/or combination smoke/fire damper supplier to determine the connections required and furnish and install any and all equipment required to control the damper.

2.02 EXISTING FIRE ALARM CONTROL PANEL MODIFICATIONS:

- A. Modify the existing Fire Alarm Control Panel to add the fire alarm system elements as shown on the plans and the additional system function requirements as outlined in this specification. Additional Fire Alarm System functional requirements shall be as follows:
 - 1. Alarm initiating zones as indicated on plans with one alarm lamp and one trouble lamp per zone. All zones shall be smoke verification type, with time delayed verification on smoke alarms. Manual station operation shall instantly alarm.

2. Audible and visual alarm system zones as indicated on plans for the indicated alarm horns and visual alarm indicators, designed to supervise all circuit wiring.
3. Trouble circuitry for ground detection, open circuit conditions, and other required trouble conditions.
4. 'Power On' lamps, trouble silencing switch(es), audible and visual trouble indicators, master smoke reset switch, auxiliary control circuits, acknowledge switches, and all other required circuitry and components.
5. Drill switch. Switch shall have ON-OFF position. When turned "ON", the system shall sound all alarm horns and flash all visual indicators, but shall not report the alarm to the fire department. Drill switch shall be key operated.
6. Standby batteries. Batteries shall be rated for 48-hour standby and 10-minute continuous alarm.
7. Provide fan shutdown contacts, to transfer on any alarm condition. Verify point of connection to air handling equipment with mechanical section. One (1) set of contacts shall be provided. All wire and conduit for all fan shutdowns shall be furnished and installed by the electrical contractor. Final connections to the required fans shall be performed by the controls contractor under the mechanical section of the contract documents.
8. Provide interface equipment to close smoke dampers and/or combination smoke/fire dampers. Coordinate operational functions with the authority having jurisdiction to comply with all codes and local/state/national requirements.
9. Provide interface equipment for elevator capture and control to comply with any and all local/state/national code requirements.
10. System shall have intercom capability and alarm acknowledge annunciation with the Rescue Assistance Needed Pull Station. Control unit shall have a button to acknowledge the alarm at the Rescue Assistance Needed Pull Station. This button shall activate a light at the Rescue Assistance Needed Pull Station to indicate that the alarm has been acknowledged. This is to enable a hearing impaired person to see that the rescue personnel has acknowledged the rescue assistance request. The control unit shall also have an intercom for two way communication with the Rescue Assistance Needed Pull Station. When the Rescue Assistance Needed Pull Station is activated, the intercom shall become operational. The control unit shall have a volume control and a "Push-To-Talk" button. Intercom operation at the Rescue Assistance Needed Pull Station shall be hands free.
11. Upon the alarm activation of the smoke detectors in the zone noted for the stage, fire alarm control panel shall give a contact closure which shall activate the stage smoke vents. When the fire alarm panel is "RESET", the contacts shall open which shall cause the smoke vents to close. The fire alarm control panel shall have indicator lights to show the status of the stage smoke vents. Each smoke vent shall have a switch (switch furnished and installed by the stage smoke vent manufacturer, wired by the Division 16 Contractor) to indicate the open/closed status of each vent. The fire alarm control panel shall have indicator lights to show the status of each vent, RED light for open, GREEN light for closed.

2.03 AIR DUCT SMOKE DETECTORS:

- A. The air duct smoke detector shall be installed in the return air duct where shown on the drawings and shall sample air and allow for the detection of smoke and combustion particles. Air sampling shall be accomplished through sampling and return tubes which extend into the air duct. The sampling tube shall extend the full width of the duct (coordinate with the HVAC plans to determine all duct widths) while the return tube shall set at one-half the tube width, or 12 inches, whichever is less.
- B. The air duct smoke detector shall actually be photoelectric type, mounted in a dedicated, separate housing.
- C. Fire Alarm Air Duct Smoke Detector shall match the existing system air duct smoke detector.

PART 3 - EXECUTION

3.01 WIRING:

- A. All conductors shall be installed in metallic raceways per Section 16111. All conductors shall be copper, #14 minimum.
- B. All connections to terminals on any equipment in fire alarm system shall be made using spade lugs of a suitable size and type for the furnished terminal and wire.

3.02 AIR DUCT SMOKE DETECTORS:

- A. All Air Duct Smoke Detectors shall be furnished by Division 16 (Electrical Contractor), installed by Division 15 (HVAC Contractor), and wired by Division 16 (Electrical Contractor).

3.03 INSTRUCTIONS:

- A. Upon completion of the installation and acceptance of the installed Fire Alarm System the equipment supplier shall submit 6 copies of operating instructions, general service information, recommended parts list, and revised wiring diagrams. Any items included in the pre-installation submittal may be omitted from the final submittal.
- B. The equipment supplier shall provide 2 hours of instruction in the operation of the Fire Alarm system to the building personnel. Instruction sessions shall be coordinated so as to be mutually convenient to all participants.

3.04 TEST:

- A. A factory authorized representative shall check and test the completed system including the test of every alarm initiating device and every signal device. This test shall have been done and all deficiencies corrected prior to final inspection. At final inspection the contractor shall provide the services of a factory authorized representative and every device shall again be tested and demonstrated to be in proper operating condition. The system shall have been "on" a minimum of 24-hours prior to the final test.

END OF SECTION